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The Journal of HEREDITY

A monthly publication devoted to Plant Breeding Animal Breeding and Eugenics

THE "BEAUTIFUL PINE" OF JAPAN
(see page 33)

Two Years of the New Immigration Law
Robert deC. Ward

Persian-Merino Sheep Crosses
J. Burtt Davy

The Theory of the Gene
L. C. Dunn

JANUARY, 1927 Vol. 18, No. 1

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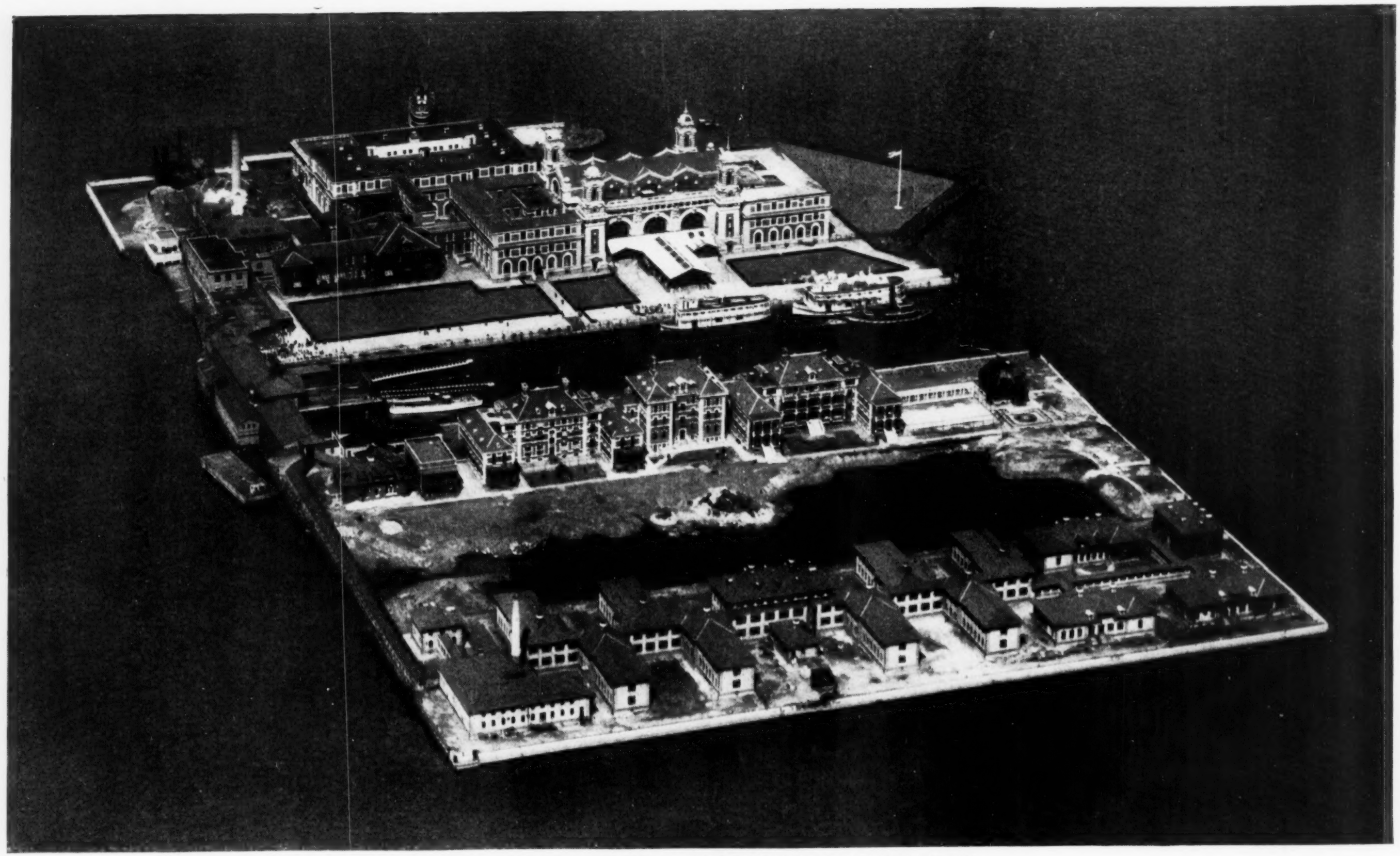


OUR BEST-KNOWN IMMIGRATION STATION

Frontispiece

In the high tide of immigration before the war Ellis Island was nearly always crowded with new arrivals from Europe. Fewer immigrants are entering the country today, and a smaller proportion of them enter through Ellis Island. Photograph, courtesy of Harry E. Hull, Commissioner General of Immigration.

THE SECOND YEAR OF THE NEW IMMIGRATION LAW

ROBERT DEC. WARD
Harvard University

I. The Importance of the Law

FROM every side comes the testimony of unprejudiced and competent observers as to the wisdom of our new immigration policy which, even in the short space of time since its adoption, has abundantly justified itself.

President Coolidge has said:

> I believe this law in principle is necessary and sound, and destined to increase greatly the public welfare. We must maintain our own national economic position; we must defend our own national integrity.

Hon. James J. Davis, Secretary of Labor, has said:

> The United States today stands before the world with the announcement that America is first of all for her citizens, and that the kind of guests she will receive and the number who in the future may be permitted to come in from without are going to be determined by the interests of those already here. She has announced that she intends to preserve her national institutions, that she does not intend to make the mistake of certain nations of the past; she is willing to absorb, but not to be absorbed.

Professor Thomas N. Carver, of the Department of Economics, Harvard University, has said:

> This law, passed by overwhelming majorities in both Houses of Congress, is sound economic policy, based on bedrock principles. It is doing more toward raising the standards of living and the general economic level of our people than any other law placed on our statute books during the last twenty-five years. It is humane to our own working people.

Professor Henry Pratt Fairchild, of New York University, in his new volume entitled *The Melting-Pot Mistake*, has said:

> The restricted aspects of the new immigration law have a profound and salutary bearing on the assimilation problem of the immediate and more distant future. There are good reasons for believing that the limitation of numbers came just in the nick of time. A few years of the voluminous immigration that would have poured into this country if there had been no restriction would almost certainly have worked disaster to the American nationality that could never have been repaired . . . . The Immigration Act of 1924 may justly be regarded as one of the most influential and far-reaching pieces of legislation ever enacted in human history . . . . Unrestricted immigration . . . . . was slowly, insidiously irresistibly, eating away the very heart of the United States. What was being melted in the great melting-pot, losing all form and symmetry, was the American nationality itself.

On all sides there is rapidly-growing testimony as to the educational, economic and social benefits resulting from our new immigration policy. By reducing immigration, and by increasing the proportion of immigrants from northern and western Europe, our problems of education and assimilation are greatly simplified. We have breathing-space. We can begin to make some headway in our stupendous task of amalgamating and "Americanizing" our foreign-born. An educational authority in one of our large Eastern cities has said:

> By limiting the number of immigrants who will come in, the new immigration law gives organized education and social work its first real opportunity to help the foreigners already here to take a more intelligent part in the life of the city. . . . To accomplish constructively the delayed task of assimilation is the opportunity now afforded.

From another large Eastern city comes testimony as to the effect of restricted immigration in improving the living conditions in the tenements,

and making possible the better enforcement of the laws in relation to overcrowding and sanitation. In this same connection a recent writer has stated that:

> A survey of the prospects which the new quotas hold presages an immigration which will contribute just those characteristics of agricultural and industrial efficiency of which this country has the most need, together with the elimination of the city-dwelling aliens who seldom add materially either to the health or wealth of the nation.

II. Statistics of Immigration

In the briefest possible summary form, the essential statistical facts as to immigration under the new law are here given.

For the fiscal year ending June 30, 1925.

Non-immigrant aliens.....	60,203
Quota immigrants.....	145,971
Non-quota immigrants.....	250,912
Total aliens.....	457,086
Total number of *immigrants*	396,883*

For the fiscal year ending June 30, 1926.

Non-immigrant aliens.....	88,758
Quota immigrants.....	157,432
Non-quota immigrants.....	249,916
Total aliens.....	496,106
Total number of *immigrants*	407,348†

It will be observed that the "non-quota immigrants" greatly exceed the "quota immigrants." This is largely the result of the failure of the new Act to place quotas on the countries of the Western Hemisphere, the natives of which come in without any numerical restriction. It is to be observed that among the "non-quota immigrants" are included the wives and unmarried children under 18 of United States citizens, who are exempt from quota restrictions. That the numbers of such persons who will hereafter come in will greatly increase there can be no doubt. There has already been an increase as between 1926 and 1925. Again, while the number of legally admissible immigrants under the present law is much smaller than it was under former laws, there is a growing feeling among restrictionists that the Act of 1924, far from being too strict, is in certain respects too liberal.

III. Preliminary Inspection Overseas

Acting under provisions of the Immigration Act of 1917 (Sec. 23), as well as of the Act of 1924, a new policy regarding pre-sailing examinations was inaugurated on August 1, 1925, through the cooperation of the State, Treasury, and Labor Departments, and with the approval of certain foreign governments. Under this plan, experienced and qualified surgeons of the United States Public Health Service and trained inspectors of the Immigration Service have been sent abroad as

*The "total number of *immigrants,*" obtained by deducting the "non-immigrant aliens' from the "total aliens," includes a considerable number of aliens previously admitted to the United States who returned from temporary visits abroad. The "non-immigrant aliens" include Government officials and their families; temporary visitors for business or pleasure: persons in continuous transit through the United States; persons who enter under commercial treaties.

†With respect to the above figures for the totals, it should be observed that different totals are given in certain statistical tables in the official reports. In these tables, certain aliens classified as "immigrants" under the terms of the act are not included. These consist principally of aliens previously admitted to the United States who return from temporary visits abroad, or immigrants who state that their last place of permanent residence was the United States. For statistical purposes these are deducted from the total number of immigrants.

"Of the 496,106 aliens admitted in the past fiscal year, 289,589 were born in European countries, Germany leading the list from that continent with 62,980 and followed by England with 37,175, Irish Free State with 32,737, Italy with 31,739, and Scotland with 23,100, the other countries in Europe sending less than 20,000 each. Natives of Canada numbered 91,894; Mexico, 60,620; Other America, 30,297; Asia, 18,284; Africa, 1,025; and Australia and the Pacific islands, 4,397."—*Monthly Labor Review*, September, 1926.

ELLIS ISLAND IN THE OLD DAYS

Figure 1

This shows the great numbers of aliens who presented themselves for admission before the enactment of the new law. Quota allotments and the visa of immigration passports by American consuls abroad has made such scenes a thing of the past. Ellis Island was planned to handle large crowds and under the new immigration law one of the problems at this station is the utilization of the excess space now available. A very large proportion of the "quota immigration" from Europe still passes through Ellis Island, but since the new law has been in effect there has been a great increase in non-quota immigration over the Canadian and Mexican borders. Photograph courtesy of Harry E. Hull, Commissioner General of Immigration.

technical advisers to United States consuls. Their duties are to assist the consul in examining prospective immigrants applying for visas, and to aid him in determining their admissibility under our immigration laws before the visas are issued. If the report of these examining surgeons and inspectors is unfavorable, the consul does not grant the visa, and the alien cannot legally enter the United States. In the opinion of Government officials who are most closely concerned with the new plan, it has been working with most gratifying success. Considerable numbers of would-be immigrants have been refused their visas, on medical or general grounds, and therefore never started on their voyage, to meet with rejection on arrival here. Under the law, a final inspection must be made at the port of arrival, both by medical officers and by immigration officials. If, in spite of his having been given an overseas inspection and of his having received his visa, any alien is discovered to be excludable at the port of landing, he is still liable to deportation.

The new plan of overseas examination was started experimentally, with the consent of the governments concerned, in Great Britain and the Irish

Free State. According to a press dispatch (August 5, 1926) the plan was to be in operation on September 1 in Great Britain, the Irish Free State, the Netherlands, Belgium, Denmark, Norway, Sweden, and Poland, anad "will cover 77 per cent of the total immigration from Europe."

While welcoming every move toward making the administration of our immigration laws as humane as possible, *provided they are always properly enforced,* and while glad to have the testimony of our officials as to the success of the new plan, serious students of immigration problems are convinced that there is very great danger of relaxing the final inspection at our own ports. It is almost inevitable that the alien who has been "passed" by an American surgeon and by an American immigration inspector abroad, and who lands here with a visa, will be given the benefit of every possible mental or physical defect, or other cause, sufficient to put him in an "excluded" class. So long as the examination abroad remains preliminary only, the fact that a final inspection is to be had on this side will act as a powerful check on any possible relaxation in the efficiency of our foreign inspection service. Once remove a rigid final inspection on this side, then the danger of laxity on the part of those charged with the duty of overseas examination of immigrants would be greatly increased. The system of a double check must under no circumstances be abandoned in favor of any major control by American officials at foreign bases.

A comprehensive and thorough examination overseas can never guarantee that between the time of such examination and the immigrant's arrival in the United States some disqualification such as insanity, or latent disease, or criminal record, would not come to the surface, so that the immigrant would be clearly barred from entry under our laws. Under the terms of the Act the period for which the immigrant's visa is good is four months in addition to the period of his final voyage, so that obviously this class of cases is by no means negligible.

IV. The Admission of More "Relatives"

Realizing that the present law has the support of the great majority of the American people, the opponents of numerical restriction have not made their drive against it in the form of a direct assault. They have sought, rather, to undermine it by means of indirect attacks.

The most important and most insidious of the bills introduced in the last Session of Congress were in the form of numerous proposed "amendments" permitting a very much freer "non-quota" admission of "relatives." The "relatives" extended over a wide range, from wives and children to grandchildren, fiances, step-children, adopted children and adopted parents. The privilege of bringing in more relatives without numerical limitation (i.e., outside the quotas) was to be granted to aliens resident in the United States as well as to immigrants who have become citizens. Among these various bills, the so-called Wadsworth-Perlman Bill received the most attention because it was upon that that the opponents of numerical restriction concentrated their efforts and used their press-bureau propaganda.*

The proposals contained in this measure are fundamentally destructive of the principle of quota limitation. The

*An editorial note in *The World's Work* for March, 1926, said: "Proper emphasis should be laid on the fact that this bill has been introduced by a Senator and a Congressman who come from the State of New York. This state and this city contain an extremely large immigrant population from southeastern and Mediterranean Europe. Nor is it an irrevelant fact that Senator Wadsworth comes up for reelection in the fall. That the support of the alien peoples in whose interests his bill is drawn will be useful at that time is apparent. . . . . The success of the Wadsworth-Perlman plan would be a great national humiliation, for it would show that the persistent selfishness of a small alien minority had succeeded in thwarting the otherwise unanimous national will."

CANDIDATES FOR ADMISSION TO THE UNITED STATES

Figure 2

A variety of racial types at Angel Island Immigration station before the new law went into effect. Today hardships and disappointments are prevented by making reasonably certain of the admissibility of prospective immigrants before they sail. Formerly many were not eligible for admission even after the long voyage to the United States.

bill, in addition to giving extensive preferences within the quotas to relatives of *future* immigrants, would allow the admission, *outside the quotas* and without numerical limitation, of the near relatives of all the 7,000,000 or more alien immigrants legally admitted to the United States prior to July 1, 1924, who have filed, or shall hereafter have filed declarations of intention to become citizens. An enormous additional immigration would undoubtedly result if any such measure became law. While it would not all come at once—since more than half of the 7,000,000 above mentioned have not yet filed first papers—the immigration ultimately entering the United States under such a provision might easily total several millions. The fact is that the result of any such proposed exemptions, and probably the intent, would be to destroy this new immigration law *in toto*. That law is not nearly so severe upon "relatives" as the public is being led to believe. It admits, in non-quota classes, the wives and minor children up to eighteen years of age of all citizens. Further, preference is given, up to 50 per cent of the quotas, to skilled agriculturists and the wives, husbands, fathers, mothers, and minor children of American citizens. Statistics show that practically 80 per cent of all immigrants under the new law consist of "relatives."

The argument that the United States is separating families unless it lets in every relative of an immigrant is un-

sound. Since 1921 all aliens in overseas countries have had full notice that important numerical restrictions were in force in the United States, and that, unless they brought their families with them, they would run the risk of being separated from these relatives for a time, at least. It is the immigrant himself who, if he comes alone, does the separating. The appeal to "humanity" is plausible, but founded on false premises.

Present immigration, as well as all recent immigration, consists principally of "relatives." This entails the conclusion—long ago reached by Congress—that no law effectively restricting immigration can exempt all relatives, or even all near relatives, from the quotas. An examination of the hearings before the Committees of Congress during the two sessions under which the present Act was under consideration shows that there was no question which received more prolonged and careful consideration than this very one of exemption of relatives from the quotas. Congress deliberately decided that in general the relatives of aliens were to follow, if at all, within the quotas, otherwise the law would not accomplish the restriction deemed necessary. It cannot be said that the failure to let in, outside the quotas, the near relatives of aliens now here was an oversight. It is quite clear that, if the present immigration law is really to restrict immigration, no more loopholes in the form of non-quota classes should be permitted. To "humanize" the law too much in the interests of recent immigrants would make it unfair to our own people.

Any unprejudiced person who has read the hearings on the various "relatives" bills held by the House of Representatives Committee on Immigration during the past winter, and especially anyone who attended those hearings, cannot fail to have been impressed by one fact. The opposition to the present Immigration Act, and the desire to break it down by weakening amendments in favor of "relatives" without number, is not the spontaneous outpouring of the soul of the American people against the "inhumanity" and "injustice" of the new law. Far from it. The case in favor of these amendments was perfectly obviously a carefully rehearsed and staged performance on the part of certain chosen (or self-appointed) representatives of one racial element in our population, and that element one of recent foreign importation. The Immigration Committees of both Senate and House last year performed a very important public service when they refused to report favorably any of the so-called "relatives bills."

V. The Need of Labor and the New Law

With the great reduction in the supply of "cheap labor" which has resulted under the new quota law, certain noteworthy adjustments have been brought about in our methods of employment and in industry generally. What is happening is exactly what serious students of immigration have for years predicted would happen. Employers are turning their minds from the wasteful uses of "cheap" imported labor to the more thrifty and more steady use of existing labor supplemented by machinery. The introduction of better tools and of labor-saving machinery has progressed at an extraordinary rate. An intelligent American, with an American-made machine, can do the work of a dozen "cheap" and ignorant aliens. This is good sense. It is good business. It is sound American policy. And it will very greatly decrease the stress of unemployment. "Incidentally, a machine that never 'loafs on the job,' goes on strike, or needs Americanizing is, from the sociological point of view, a highly desirable substitute for unskilled immigrant labor."

From one end of the country to the other, reports of new labor-saving machinery are coming in almost daily. We hear of new coke-handling apparatus; of mechanical brick-makers; of ditch-diggers; of track-layers, and of

numberless other machines which are replacing crude hand labor and are at the same time saving money. The question, "Who will dig our ditches?" is answered by mechanical ditch-diggers, the largest of which can do the work of four hundred men. An improved new smelter takes one hundred men instead of five hundred. We hear of 40,000 miners in one state turning from coal mines where they were not needed to other occupations where they were needed, and so down the list. Higher wages no longer mean higher cost of living, but more produced and shared per capita. Instead of alternating "hire and fire," and running to Ellis Island whenever business starts up, we have the wiping out of seasonal employment and the transfer of idle hands to steady and productive jobs. This has not only benefited the worker himself, but has changed him from a dead weight on the community into a good customer. The cutting of labor waste has proved a very great economic gain, not an economic loss. The American-born workman is already in the ditches, working a power shovel, and this work now supports real American homes that are worth vastly more to the country than any number of "polyglot boarding houses."

"Who will do our rough, dirty work now that Giovanni's gone?," asks a recent writer. "Why, we'll do it ourselves. Not with muscle, but with power. It will still be rough and dirty—running an air drill or a steam shovel is no clerical job. But it is pure fancy to think that native Americans avoid rough, dirty jobs, and pure propaganda to maintain that this part of our national life must be turned over to green immigrants. Let the job be ever so rough and dirty, let's do it with power instead of muscle; use the man to run the machine, and pay him native American wages. You won't have to go far to hire native Americans."

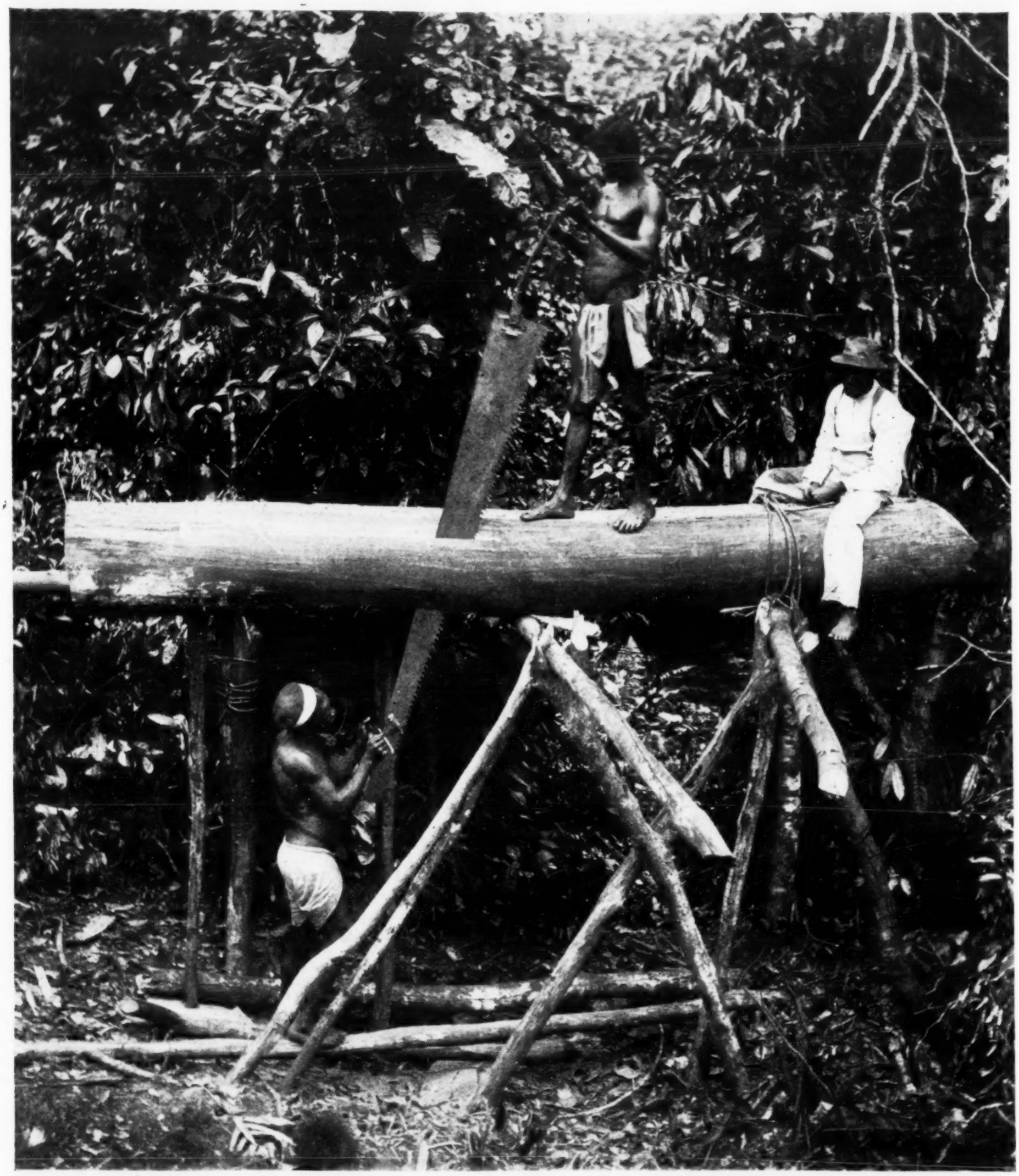
A very significant statement regarding railway labor appeared in a recent number of *The Railway Age,* from which the following excerpts are taken.

For years the railways and many other industries recruited their extra gangs or temporary labor from the newly arrived immigrants. With the reduction in the number of these men entering the country and the constant depletion of the ranks of those already here by their graduation into semi-skilled and skilled trades, it is inevitable that a scarcity in the supply of unskilled labor should develop sooner or later. The realization of this fact by those men who have concerned themselves with the future has stimulated the use of labor-saving equipment and has led in many instances to the utilization of this equipment where no immediate economy was in prospect.

Another development which has been stimulated by the approach of a scarcity of labor has been the increasing attention given to the extension of the working season and the growth of the amount of work done during the winter months, as a result of which not a few roads already have such a large part of their important work already completed that they are largely independent of any shortage that may develop this year. In spite of the marked improvements in the conservation of labor that have been made by many roads, there are other roads on which no such improvements have been made and which still endeavor to handle their work by sheer force of numbers during a season of short duration. It is on such roads that the effects of a shortage of labor, if it develops this year, will be most felt. Whether a shortage develops this year or not the threat of it will have a constructive effect by stimulating the more efficient use of the labor that is available. A labor shortage may after all be beneficial by reason of the results it produces.

Thus, by an increasing use of labor-saving machinery; by lessening the labor turnover; by smoothing out the peaks and hollows of seasonal employment; by a better distribution of labor; by abolishing excessive waste, and in many other ways, American business and American industry are adjusting themselves to the new conditions. Our new policy of numerical limitation means that there will be fewer men to do the rough work of industry, and it means a higher price for labor. But eventually it also means a lower cost of production.

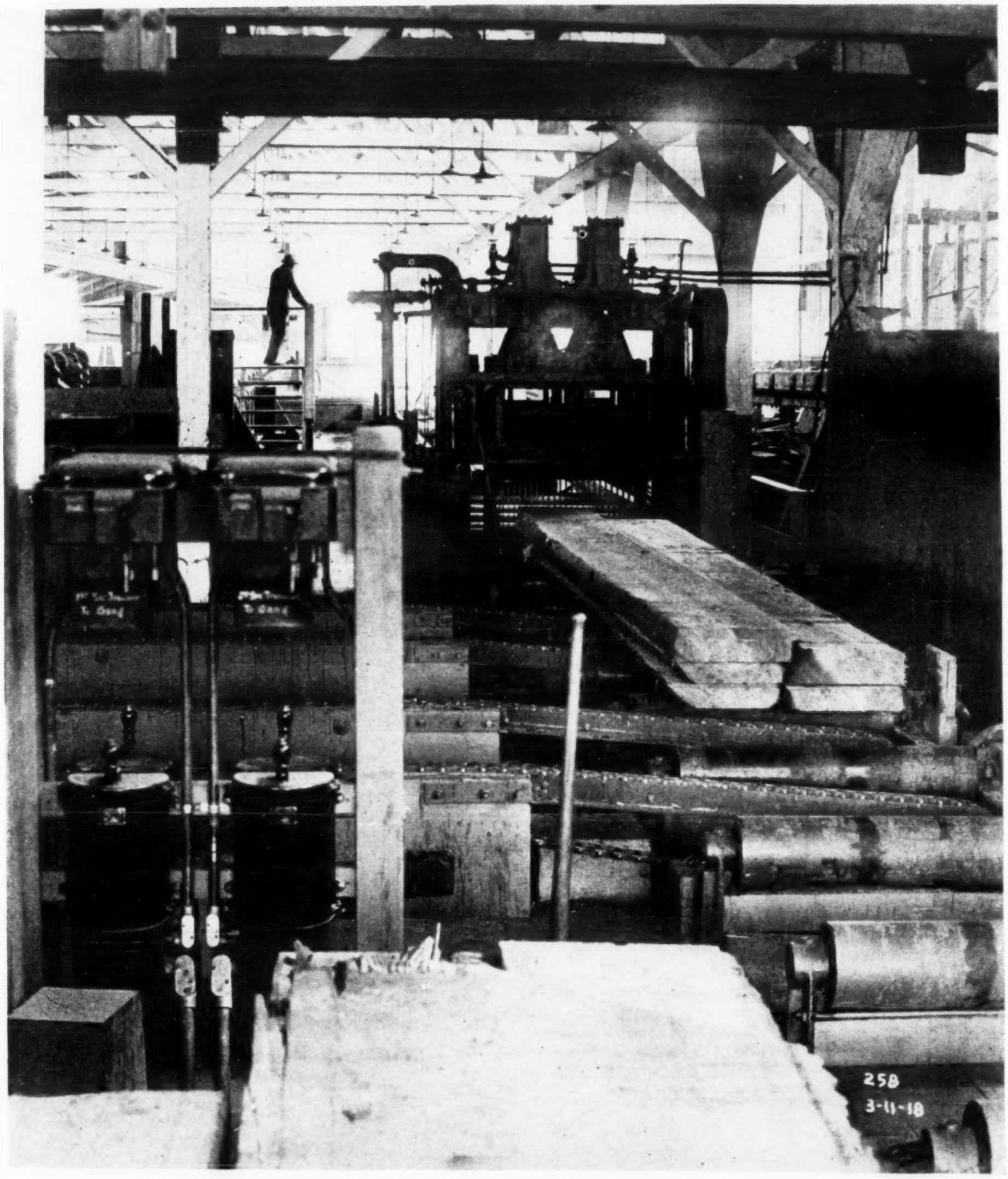
Further, it is perfectly clear that a native-born population of American, or at least partly Americanized, persons will have higher standards of living than would the children of recent im-



A PRIMITIVE SAWMILL IN LIBERIA

Figure 3

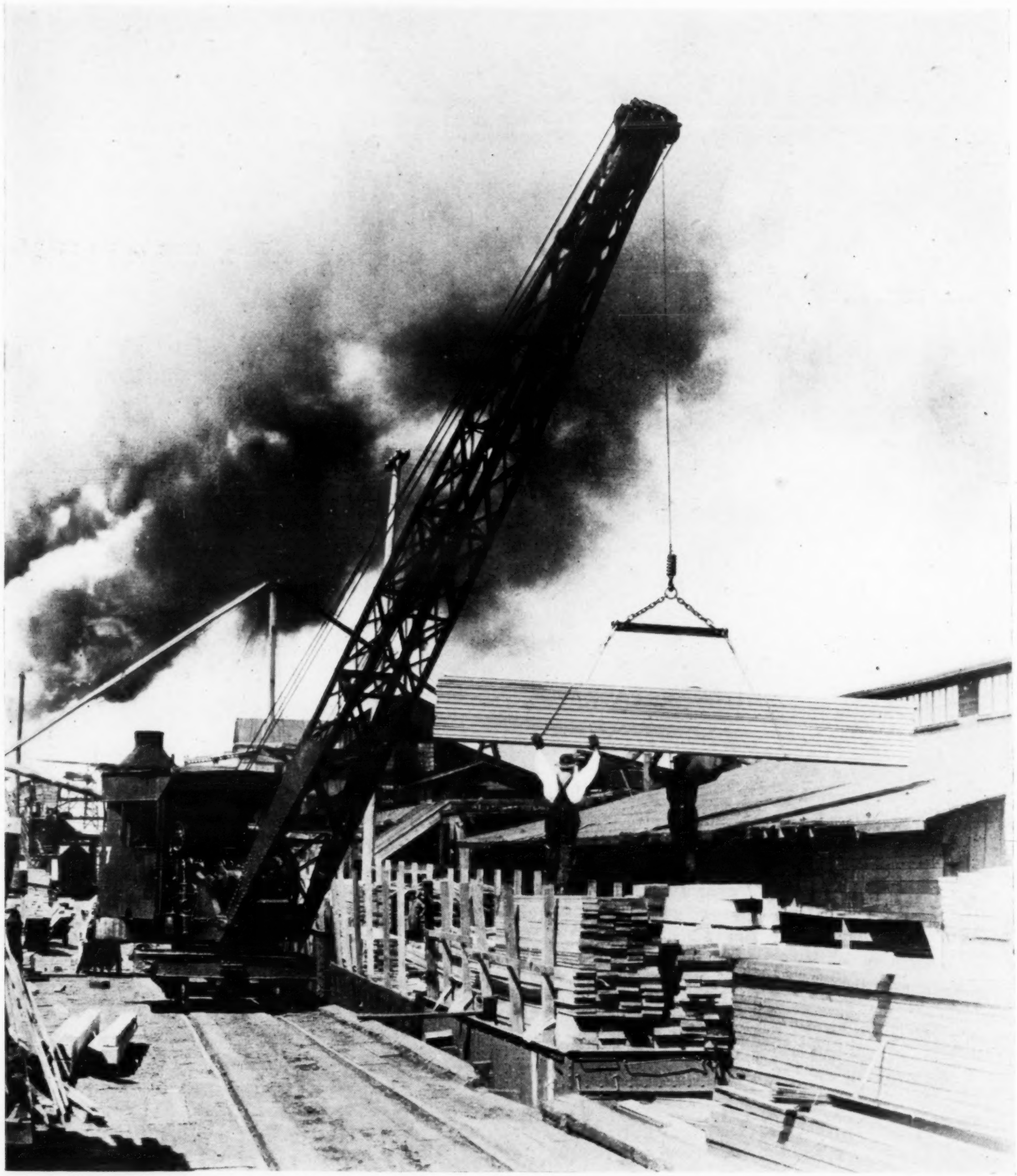
This picture and the two following show the extremes in manufacturing technique. Here we have the sawmill reduced to its simplest terms—man is the directing force and the source of power as well. Only a few boards are the product of a hard day's work. An extremely low standard of living makes subsistance possible at a very meagre wage, in contrast to modern conditions in industry, where a greatly increased rate of productivity supports a high standard of living. Photograph by G. N. Collins.



A "GANG SAW"

Figure 4

This represents what may be called the "American Method" of industrial technique. This machine cuts 125 six-inch flooring boards in about the time the other sawyers are making two strokes. Two men and a modern band saw cut 60,000 feet of lumber in an eight-hour day, by pressing electric buttons! (An average six-room frame dwelling house contains about 15,000 feet of lumber). Photograph by John D. Cress, Seattle. Courtesy of the National Lumber Manufacturers Association.



LOADING LUMBER

Figure 5

A spectactular example of the "American Method" in industry. This loading crane handles about 2,000 feet of lumber at one time. The question of taking "Giovanni's" place in doing the rough work, is answered by labor-saving machinery to such an extent that the Department of Labor considers that recent developments constitute a New Industrial Revolution (See page 19). Photograph by John D. Cress, Seattle. Courtesy of National Lumber Manufacturers Association.

migrants from some of the countries which used to send us the bulk of our immigration before the restriction law went into effect. With generally higher standards of living, the per capita consumption of commodities must enevitably increase.

Even the diminution in the supply of domestic servants, about which much has been said, is by no means a "national calamity." The home standards of comfort and living are not being lowered; they are being simplified and improved. "Better kitchens, better systems of food distribution and preparation, the magic wand of electricity applied to vacuum-cleaners and washing-machines and other devices, leave the modern housewife freer for outside activities than her grandmother who could count upon the assistance of cheap labor."

The demand for "more labor" has naturally not wholly died down. The suggestion has been made that there should be a "flexible labor supply," regulated by the "current economic requirements of the country." When there is "need of labor," aliens are to be selected overseas to supply this need, and are to be admitted in excess of the quotas. There are many obvious practical objections to the proposed plan. Suppose 100,000 or 50,000, or 10,000, or 1,000 "selected" aliens are brought here because of the need of labor in certain industries, what reason is there to expect that these people will all go where they are wanted; or, having gone there, will remain at the job they are supposed to do unless we compel them to do so? Again, while there might be temporarily an apparent need for laborers in certain industries, what would happen during a time of unemployment? Would all these imported laborers go back whence they came, or would most or all of them remain here, upsetting the permanent balance of our economic and social life and becoming a charge upon the community?

The only safe policy in regard to securing a selected body of additional workers is that recommended by the Committee on Immigration and Americanization of the Boston Chamber of Commerce, after a thorough study of the matter. The recommendation was that

> The attention of Congress be directed to the advisability of giving preference WITHIN THE QUOTA to persons skilled in occupations in which there are the greatest number of vacancies and the least possibility of unemployment.

A recent writer* has well put this matter of importing alien labor as follows:

> It is hard to see why the convenience of a factory or plantation should be served for a year or two by bringing in a low-standard crew whose eternal progeny, expanding into thousands, may poison for centuries our social fabric. It is better for all of us to work a little harder, pay more for goods and food and keep the door closed.

The late President-Emeritus Charles W. Eliot, of Harvard University, long an advocate of a very liberal immigration policy stated (*Collier's,* May 29, 1926):

> The days are happily gone when American workingmen received a dollar a day and were continually menaced by immigrants coming into this country daily by thousands.

In the opinion of Mr. Samuel M. Vauclain, president of the Baldwin Locomotive Works, the present restriction of immigration is justified by the increasing use of machinery.† Dr. Benjamin M. Anderson, Jr., economist of the Chase National Bank of New York, believes that high wages, resulting from the decreased labor supply, are a desirable condition, but involve changes of business policy and readjustments of various kinds‡

Many foreigners, also, have been quick to see the advantages which have resulted. Thus Mr. Vernon Willey, president of the Federation of British Industries, has stated (Jan. 26, 1926)

*R. W. Child in *Saturday Evening Post,* May 22, 1926.
†Press dispatch, September 25, 1925.
‡Press dispatch, March 10, 1925.

BORDER PATROL IN ACTION

Figure 6

The "bootlegging" of aliens has increased by leaps and bounds since the passage of the new Immigration Law. Our five thousand miles of land boundary are protected by a net of border immigration stations, but the bringing in of aliens is a well organized undertaking. The United States Immigration Service estimates that 250,000 deportable aliens are now in the United States, a large proportion of them having entered the country illegally. It is said by those who have tried both that for sustained excitement the border patrol is to be compared with service in France during the World War. Photograph courtesy of Harry E. Hull, Commissioner General of Immigration.

that increased personal efficiency in the United States has more than offset the loss of the annual flood of European immigrants that used to come in.

VI. Mexican and Canadian Immigration

The Act of 1924 places no quota restrictions upon Canada, Mexico, or the other countries of the Western Hemisphere. In consequence, there has been a very considerable influx, especially from Canada and from Mexico, and there is an increasing demand that the quota restriction be extended to cover the Western Hemisphere.

The situation as to Mexican immigration is very serious. Not only is this influx already too large, but it is certain to increase. From the States along the Mexican border, Mexican laborers are rapidly spreading northward and eastward. They are in Colorado; in Minnesota and other Northwestern States; in Illinois; in the Pennsylvania steel mills; on the railroads all through the Middle West. But little can be known definitely as to the annual Mexican immigration, for the number legally admitted is but a small proportion of the total. The number of "bootlegged" Mexicans, who cross the land border illegally, and of "wetbacks" who swim across the Rio Grande, is very much greater. It has been reported that when the immigration authorities made a round-up of illegal entries in the Imperial Valley a few months ago, it was estimated that between 5,000 and 10,000 of the Mexicans employed there, perhaps 80 per cent of the total number, had entered the United States illegally. While it is true that many of the Mexican laborers

who work in this country during harvest time go home again in the winter, this tendency is evidently decreasing. Mexican peons are gradually going into big industries, and into the large cities, and as time goes on will more and more become permanent members of the community.

Mexican peons are good "raw" laborers. They do outdoor work on farms, railroads, dams, aqueducts, roads and construction enterprises, chiefly still in the southwest and in Southern California. They are as a rule peace-loving, docile and obedient. They are good to their families. But on the other hand they are a serious social problem. They know and care little or nothing about sanitation; they live huddled together in shacks or freight cars and, in increasing numbers, in congested "Mexican quarters" on the outskirts of Western and Southwestern cities, without proper sanitary facilities. They are prone to disease and their death rate from tuberculosis is high. In the districts where they congregate in considerable numbers, poorhouses, dispensaries, hospitals, are largely carried on for them. The expense is already very heavy.

Congressman Box, of Texas, whose services on the House Immigration Committee have been of inestimable value in the fight for restriction, has brought evidence to show that there appears to be an agreement between the immigration authorities and the farmers' organizations in the Southwest to permit "bootleg" Mexican immigrants to remain, and not deport them, provided the head tax is paid in three-dollar monthly installments. This is not only illegal, but it is a most dangerous and deplorable situation.

It has been urged that these Mexican laborers and their families are no more of a burden upon the social and welfare agencies of the Southwest than are the lower levels of European immigrants in Eastern cities. But to be no worse than the worst is a pretty feeble argument. The burden upon charitable agencies will increase as more and more Mexicans migrate northward and spend the winters in cold climates to which they are not accustomed, and for which they have neither the means nor the foresight to prepare. Other problems are also appearing on the horizon, for example the school problem, with its possibilities of friction between the native white children and the Mexicans.

What is happening is very simple. The Mexican peon, with a standard of living so low that American labor cannot compete with him, and with indefinite powers of multiplication, is being substituted for "cheap labor" from southern and eastern Europe. We hear the same old story of the "need of labor" that has been dinned into our ears for decades. We did not limit immigration from Europe in order to substitute other races impossibly alien in character and tradition, nor can we raise our standards of living and citizenship by that process. The country is prospering under restricted immigration because we are making more effective use of the labor we have, at higher wages. Our way out is not by substituting Mexicans for European immigration, and going backward, but by working out better living conditions for all of us by the labor of our own people. There is enough native labor to do the necessary work if the large agricultural and other interests will pay adequate wages, on which an American can support himself and his family in decency and comfort. No self-respecting white laborer can compete with a Mexican peon who works for a small wage and exists in poverty and wretchedness. By allowing present conditions to continue we are developing a new class of permanent "coolie" labor in the United States.

Our great Southwest is rapidly creating for itself a new racial problem, as our old South did when it imported slave labor from Africa. At a Hearing before the House Committee on Immigration in Washington last winter a number of sugar-beet growers and Southwestern cotton-planters were telling the Committee that they must have

POTENTIAL IMMIGRANTS STOPPED AT THE BORDER

Figure 7

The removal of aliens from box cars is one of the important duties of the border patrol. With only a small force covering such a large area many undesirable aliens do get in, and to help in stopping this, registration of all aliens in the United States is suggested. Photograph, courtesy of Harry E. Hull, Commissioner General of Immigration.

more Mexican laborers for the rapid development of their several enterprises. A Southern Congressman asked one of these men the following pregnant question: "Have you studied the history of what my forefathers did in trying to solve the labor problem, in bringing in black labor because they could not get anybody else? Have you studied the history of that effort with all the consequences it brought to the South and our country? Are you free from apprehensions that if you carry it forward in your State you will not bring about that or some kindred trouble?" Hon. Albert Johnson, the able and efficient Chairman of the House Committee on Immigration, to whom, more than to any other man, this country owes the present immigration law, has said that in no one year were more than 8,000 blacks ever imported from Africa. "Who would have thought then that a fearful racial problem, leading to a great war, would come from their introduction? Yet today one out of every twelve persons in the United States is a black." The number of Mexicans coming into this country every year is probably many times greater than the number of negroes that ever came in ten years.

Mexican immigration is less assimilable than is that from southern and eastern Europe, and probably even less so than Japanese and Chinese.* Its birth-rate is appallingly high. And every Mexican child born on American

*A survey of the population of the countries to the south of the United States by Robert F. Foerster, Professor of Economics at Princeton University, made a part of the Hearings before the Committee on Immigration and Naturalization of the House of Representatives in March, 1925, shows that except in two or three of the countries referred to, not more than 10 per cent of the population is of pure white stock.

soil is an American citizen, who, on attaining his or her majority, will have a vote.

Because of the great necessity of preserving the white race in the United States, as well as the desirability of protecting American standards of living, the Act of 1924 should be extended so as to place quota restrictions on all those countries of the Western Hemisphere where the population is not preponderantly of white stocks. Until numerical restriction is imposed on the countries referred to, one of the principal objects of the recent act cannot be attained.

Canadian immigration presents a difficult but also a different problem, which, perhaps, must be separately treated. Not only is this because of the close relations, commercial and other, existing for a long period between Canada and the United States, but also because Canada is the only country of the Western Hemisphere from which we have received any considerable immigration almost exclusively composed of white races. As to Canadian immigration, however, the question must be considered whether some definite limit should not be put upon it in order to protect the American standard of living from the influx of cheap labor. There have not been wanting signs that a limitation of Canadian immigration into the United States would not be altogether unwelcome to certain interests in Canada which deplore the fact that so many Canadians leave their own country for ours.

VII. Registration and Deportation

Within the past few years various investigations, both official and otherwise, have brought to light some very startling facts regarding the numbers of undesirable aliens in this country. We are being overrun with alien gunmen; alien dealers in narcotics; alien violators of the prohibition law; smuggled aliens; deserting alien seamen. The Department of Labor has estimated that there are now approximately 1,300,000 aliens here who would be deportable for various reasons had not the time limit expired within which, according to the present law, deportation can be effected. According to Hon. John C. Box, "the same survey shows that of aliens who have entered the country since June 3, 1921, 250,000 are deportable under the law because of their illegal entry or of offenses committed by them requiring their deportation. But just as 1,000,000 out of 1,300,000 have escaped deportation through lack of funds, lack of force, the failure to enforce the law, and statutes of limitation, so only a small minority of the 250,000 or 300,000 whose deportation is not barred will be sent out of the country. Most of the 1,300,000 mentioned were smuggled in." While it is true that the Immigration Service has been greatly hampered by lack of funds in this regard, and with an increased appropriation made by Congress last spring the number of deportations has lately very decidedly increased, it is perfectly clear that there is need of a stricter and more far-reaching deportation law than we now have. After a careful study of the whole situation here briefly referred to, the House Committee on Immigration last spring reported favorably the Holaday deportation bill, which passed the House by a large majority (about 7 to 1), but was not acted on by the Senate owing to the pressure of business during the closing days of the Session. This bill should pass the Senate without delay in the Short Session. It is an excellent measure, and if enacted into law would very greatly reduce our present highly undesirable and unwelcome alien criminal population, as well as the numbers of alien insane, feeble-minded and dependent classes in public institutions. It provides for the deportation of aliens convicted in courts of record of the offenses of selling narcotics and intoxicants and sentenced for a certain required time. It makes it an offense punishable by fine and imprisonment to enter the United States by eluding inspection or by fraud or by misrepre-

sentation. Limitation now bars deportation proceedings against otherwise deportable aliens in much too short a time. This act makes that time much longer in some cases, and in many cases provides that they may be deported "at any time after entry." There are also provisions for the more rigid enforcement of the deportation laws. The alien criminal, the distributor of narcotics, the foreign-born insane, the smuggled repeater, and other highly undesirable aliens are all taken care of in this bill. Our people know perfectly well that this kind of stock is not only an expense and a burden in itself, but that its descendants will make a huge and increasing load for the future. It is significant that only those of alien race or sympathies opposed this bill. As a measure of protection to aliens legally admitted to this country and law-abiding residents therein, as well as a necessary step toward discovering illegal entrants and alien criminals for purposes of deportation, an alien registration or enrollment law is required. Such a plan, long and ably advocated by Hon. James J. Davis, Secretary of Labor, is supported by our leading authorities on immigration. If our immigration laws are to be effectively enforced, and if deportation of illegal entrants and of criminal and other undesirable aliens is to be accomplished, then alien enrollment must become a part of our immigration machinery. At the same time it would also naturally and logically become part of our naturalization machinery, an alien's successive annual enrollments being taken as his preliminary steps toward becoming a citizen.

To sum up, then, the most pressing needed legislation is (1) extension of the quota limitations to Mexico and other countries to the south of the United States, with perhaps some form of numerical limitation for Canada; (2) passage by the Senate of the deportation bill already passed by the House; (3) the enactment of an alien registration or enrollment law.

A Journal of "Protoplasmology"

PROTOPLASMA. International Journal of the Physiological Chemistry of Protoplasm. With the co-operation of R. CHAMBERS and W. SEIFRIZ, edited by J. SPEK (Heidelberg) and F. WEBER (Graz). Publisher: Gebrüder Borntträger, Berlin and Leipzig.

Among the many biological periodicals that recently have come to life "Protoplasma" perhaps will prove to be the most valuable. Within a few years the investigation of the chemical and physical properties of protoplasm and particularly the problems of colloidal chemistry have become an independent discipline in the field of natural science. Until now, the papers dealing with such questions have been scattered over many periodicals which have been frequently difficult to reach. The list of co-operators of "Protoplasma" shows that from the beginning the effort of the editors to centralize in one journal the work on problems of protoplasm has met with astonishing success, and it is to be expected that this union will strengthen the efforts of everyone working in this field. The geneticist doubtless will find in the new periodical much valuable information on his road towards an understanding of the physiological processes involved in the expression of many inherited traits and for the cytologist it certainly will become an indispensible tool for his work. The periodical will be published at irregular intervals, 4-5 issues (with approximately 640 pages) forming a volume. Contributions will be accepted in either English, French, German or Italian. Reviews, critical abstracts and lists of the complete literature of special problems will be a regular feature of the journal.

P. P.

THE NEW INDUSTRIAL REVOLUTION

Amazing Increases in Productivity of Labor—Due in Large Part to Immigration Restriction—Eugenic Significance of Such Changes

WITHIN the last decade very remarkable gains have been made in the productivity of labor in the United States. The Bureau of Labor Statistics has recently completed a study of productivity in eleven industries. That a surprising situation has been discovered is indicated by the introductory paragraph in so conservative a Journal as the *Labor Review*:

> There is taking place in the United States today a new industrial revolution which may far exceed in economic importance that older industrial revolution ushered in by the series of mechanical inventions which occurred in England in the last quarter of the eighteenth century, and which eventually transformed English industrial, political, and social life. Many people today are aware of the fact that great improvements in machinery, processes, management, and output are taking place; but, except for a few magazine articles from time to time, very little has been done to express this advantage in productive e f f i c i e n c y in comprehensive terms. Some people have hesitated to accept as typical of industrial production as a whole the surprising figures of improved output in particular plants or establishments. And yet, even when we deal in mass figures, the facts stand out clearly and unmistakably. We are at the present time experencing what is perhaps the most remarkable advance in productive efficiency in the history of the modern industrial system. In the automobile industry the output per man in 1925 was three times as great as it was in 1914, an almost incredible increase in productivity in an industry which had attained, even before 1914, a high state of efficiency. Taking the output per man in 1914 as a base of 100, we find that the output in 1925 was for the iron and steel industry nearly 150 and for the boot and shoe industry 117; while on a 1917 base the output per man in 1925 in the paper and pulp industry was 134. And these figures, surprising as they are, cover only about a decade.

The article then discusses at length the difficulty of making reliable indexes of employment and of production. In the steel industry the situation is summarized as follows:

> The table seems to show that the output per worker in the iron and steel industry increased about 50 per cent from 1914 to 1925, but this is undoubtedly an exaggeration of the actual facts, for the year 1914 was one of severe depression, while 1925 was at least a good year, if not one of actual prosperity. In an industry so sensitive to good and bad times as the iron and steel industry, there is need for caution in drawing comparisons between depression and prosperity years, since there is in the figure no adequate adjustment for changes in man-hours due to changes in business conditions. . . . . But with returning prosperity the figures for productivity become more significant, and despite the abolition of the 12-hour day, or perhaps because of it, the index reaches new high figures. In view of the fact that the index for 1914 is probably much too low for a fair comparison with the year 1925, it may be more satisfactory to use two-year averages in each case. Taking an average index for 1914 and 1916 as 100, the average for 1924 and 1925 is 124.4. This makes an increase of approximately 25 per cent between the two periods.

The automobile industry and the rubber industry show the most marked gains in productivity. The conclusion in regard to the automobile industry emphasizes how surprising this increase has been.

> Even allowing for the possibility of errors, there is no escaping the conclusion that the output per worker has been increased enormously in this industry during the last 10 years. The index is 310, which means that each worker is producing more than three times as much as he did before the war. The amount of this increase seems almost incredible, and is probably too high. Since 1914 was a year of depression, post-war and pre-war comparison is more accurate if the year 1916 is taken as indicative of conditions before the war. On the 1916 base, the index for 1925 is slightly over 181, indicating that output per man has not quite doubled in 10 years. Obviously,

the standardization of processes, the invention of machines, and the improvements in management in this industry during the decade have resulted in a remarkable increase in productivity of labor.

Even in older and more highly standardized industries a surprising increase in productivity is noted. The conclusion discusses the general import of the different studies:

Two points must be emphasized in order to guard against any misrepresentation of the import of this study. The first involves the validity of the use of an index of employment of man-hours without taking into consideration the differences in skill and ability of the various classes of workers. There are office employees on the one hand and wage earners on the other; there are the managers and the workers, engineers and ditch diggers, labor direct and indirect, workers skilled and unskilled, and even within the same class there are fast workers and slow ones, good workers and poor ones. In the indexes as constructed, these were considered equal and lumped together, each man counting as one. The objection is often raised that an average of this sort does not mean much. A factory owner may introduce a labor-saving machine which eliminates five unskilled workers, but may have found it a financial loss because it requires two highly trained men to tend it. Theoretically, this machine saves physical labor; but at the same time it increases the use of trained or skilled labor which is much more scarce and more costly. . . . .

The second point which must be emphasized is that there is in this study, and particularly in the use of the word "productivity," no implication as to which group among those cooperating in production was responsible for the increased output, and no suggestion as to whom the benefits are being, or should be, given. These are theoretical questions of imputation, while this study is primarily concerned with measuring and fact finding. The "productivity" is a matter of the whole industry rather than of labor specifically. There are three general classes of men cooperating in production—workers, capitalists, and executives or managers. The output may be increased through an invention of one of the workers, through research carried on at the expense of the capitalists, or through new processes installed by the managers. It is recorded, for example, that the pulling-over machine in the shoe industry was finally perfected at a cost of over $1,000,000; and the remarkable increase in production in the automobile industry has been due largely to new methods of routing materials and establishing endless belts for carrying the work along. In some industries increased productivity can be traced directly to saving in overhead expense and reduction large-scale use of capital, with its resultant reduction of waste.

The same tendency is to be noted in agriculture. In the *Monthly Labor Review* for December, 1926 is a discussion of recent tendencies in farm management:

Harvesting used to be the biggest problem in connection with wheat growing, involving, as it did, so much labor and equipment that it was practically impossible for the ordinary farmer to own the machines or hire the necessary men. The old stationary outfit, consisting usually of 3 headers, 9 wagons, an engine, a thresher, and other accessory equipment, required from 30 to 35 men and from 65 to 75 horses, which made it necessary for several farmers to own an outfit in partnership or hire threshing done by a traveling thresherman. In either case each farmer had to await his turn and many of them suffered serious loss to the crop through not having it threshed when conditions were right. And in any case the expense of harvesting was enormous—about $150 per day at present wage rates for pay roll and from $50 to $75 per day for the hiring of horses. Therefore, while an outfit of this kind could usually harvest from 75 to 90 acres of wheat per day, it was a costly method of harvesting. The next step in the development of labor-saving machinery came with the 18-foot combined harvester, drawn by a tractor or by 33 horses, manned by 5 men, and cutting about 30 acres in a good day's run.

The latest devolopment, which is the one discuseed by Mr. Wilson, is the 12-foot harvester, drawn by a tractor and run by two, or at most three, men. This machine should cut somewhat more than 15 acres per day, and it is so inexpensive to purchase and operate that every farmer could afford to own one. It is hoped that this new method of harvesting will make it possible for two men to harvest as much wheat as they can seed. Then, by dovetailing corn production, silage, and dairying with wheat growing, a farmer with one hired man could work a dry-land wheat farm of about two sections (1,280 acres) with no additional labor of any kind, thus almost stabilizing employment in one of the most seasonal of all industries. This diversified farming, with sufficient motive power and high productivity of labor, is one method of meeting the falling prices of agricultural products and the occasional seasons of drought. It

suggests the possibility of the further application of machinery to agriculture and the improvement of agricultural labor productivity to a point more nearly on a par with the productivity of labor in manufacturing industries.

In neither of these studies is the reason for the changes discussed. It would seem, however, that an important factor must have been the reduction of immigration during the war period and the restriction laws in force since that time. Neither do the articles discuss the eugenic implications of these changes. Their importance is indicated by an interview with Henry Ford which recently appeared in the *World's Work*. He says that the minimum wage question does not disturb him. In so highly specialized a system as the Ford factories an individual who is worth only a minimum wage is a liability rather than an asset. Hence there is a constant elimination of those who cannot measure up to the rising standards of American industry.

The "American Method" in industry thus not only tends to bring about changes in the quantity but in the quality of the population as well. The interview with Mr. Ford also emphasizes other interesting points. He is convinced that the short day and he short week are economically sound and have come to stay. It was found in the Ford plant that some individuals were not able to make profitable use of the increased leisure. Those who were not rendered more efficient by the intelligent use of the two-day holiday sooner or later eliminated themselves and no doubt there is a similar tendency in many industries.

Robert Cook.

The Inheritance of Dementia Praecox

FAMILIENPSYCHOSEN IM SCHIZOPHRENEN ERBKREIS, by HERMANN HOFFMAN, privatdozent for neurology and psychiatry at Tuebingen. Pp. 120, price $1.80. Abhandlungen aus der Neurologie, Psychiatrie, Psychologie, und ihren Grenzgebieten, Heft 32. Berlin, Verlag von S. Karger, 1926.

Analyzing several hundred pedigrees collected by E. Rüdin, Dr. Hoffman concludes that people who develop dementia praecox have usually shown a schizoid temperament earlier in life, and that the parents have also shown the same temperament. He concludes that the behavior of dementia praecox depends on primitive action patterns which are present in every one, and which recall the behavior of the child and the savage. They are given expression only in those who have inherited a certain temperament. This temperament also tends to go with the asthenic constitution—the tall and slender build of the Nordic. It is possible that inherited factors which, among other things, influence the glands of internal secretion, may tend to determine both this constitution and this temperament, and therefore predispose to this type of psychosis. Dr. Hoffmann's study is scarcely conclusive, but it is distinctly suggestive and valuable.

P. P.

THE THEORY OF THE GENE

A Review

THE title of Dr. Morgan's most recent book* may seem at first blush somewhat misleading. The prospective reader who has heard of genes is apt to expect from the title an extended discussion of the physical structure, origin, and behavior of these hypothetical units of inheritance. The gene, however, remains an abstraction and discussion of its nature is still in the realm of speculation, and as such finds very little place in this book. What it contains chiefly is an excellent critical review of recent advances in genetics, considered from the viewpoint of a body of fundamental principles which Morgan has called "The Theory of the Gene." He states this theory as follows: "The theory states that the characters of the individual are referable to paired elements (genes) in the germinal material that are held together in a definite number of linkage groups; it states that the members of each pair of genes separate when the germ-cells mature in accordance with Mendel's first law, and in consequence each germ-cell comes to contain one set only; it states that the members belonging to different linkage groups assort independently in accordance with Mendel's second law; it states that an orderly interchange—crossing over—also takes place at times, between the elements in corresponding linkage groups; and it states that the frequency of crossing-over furnishes evidence of the linear order of the elements with respect to each other."

The gene as the unit of all inheritance is plainly the primary concept which unifies these several principles. The assumption of its existence, given the sort of evidence which now supports it, and regardless of the details of its nature and behavior, appears now to be the most fundamental of all of the theories advanced by students of inheritance and after a reading of the book one will grant its right to give title to a general theory of inheritance.

The introductory discussion of principles is followed by a short chapter in which the modern theory of the gene is oriented with respect to previous and seemingly similar assumptions of units of inheritance, particularly the theories of Spencer, Darwin and Weissmann. No direct lineal relationship can be traced between these older speculations and the present theory, however useful some of them may have been in the development of genetics. The fundamntal principle of genetics traces directly to Mendel's assumption; or in order to bring the ancestry of the gene theory up to date, we may say that it is directly "out of Mendel by Morgan." The same reasons for the cogency of Mendel's principles apply as well to the present theory—"it has risen step by step by experimentally determined genetic evidence that has been carefully controlled at every point." It was the lack of this support that condemned the older speculations to their present desuetude.

There follow two further explanatory chapters on the mechanism of inheritance and the relations of chromosomes and genes, in which the new evidence for the chromosome theory, derived chiefly from experiments with Drosophila, is given. The origin of mutant characters is discussed in two chapters, the second of which is an attack and refutation of the presence and absence theory. The theory that mutation is merely a change in an existing gene and does not involve loss of a gene is vigorously defended with evidence from

*MORGAN, T. H. The Theory of the Gene;—The Silliman Memorial Lectures given at Yale. Pp. 343, price $4.00. Yale University Press, 1926.

recurrent mutations and multiple allelomorphs.

The remainder of the book is chiefly a critical discussion of new evidence on two of the most actively studied subjects in present day genetics, i. e. changes in chromosome numbers and sex. The evidence assembled from diverse animals and plants is impressive and it is obvious that Drosophila need no longer bear the full brunt of the proof for the intimate connection of genes and chromosomes. One notes too that the best of the new evidence is the result of cytological studies and of breeding experiments aided and guided by the methods and ideas of physiology and morphology. In spite of the emphasis on chromosomes in these chapters, the interpretation throughout is guided by the author's conclusion (p. 104) that "since it is the genes, and not the chromosomes as such, that are important, the final analysis of the hereditary construction must be determined by genetics rather than by cytology." Consequently changes in chromosome number are regarded as exerting an influence on the characters of the organism chiefly through the duplication or disturbance of the balance between the genes. The altered nuclear-cytoplasmic ratio which exists in all except normal diploid forms is discussed as a cause of development rather than purely genetic differences. The general significance of changes in chromosome number for the theory of the gene is briefly discussed in the concluding chapters. Changes in chromosome number lead usually to general and not very striking or specific changes in the organism. The number of genes has not been greatly altered. A change in one gene (mutation) however may produce more specific or striking effects because it is more likely to upset the established relation between all the genes. It is the interrelations of genes themselves and not the ways in which they may be arranged in the cell which determine the course of development and the specific and end-product or character.

The chromosome differences between the sexes are also regarded as incidental to the fundamental differences in the distribution and balance of the genes. The whole discussion of sex in this book is of much greater complexity and vastly greater interest than it was when sex was a simple story to be told in terms of x, y, w, and z. Sex, in the experience of all who studied it, was not destined to be explained so simply, nor did the first explanation assume that it was so simple. The recent discoveries in respect to intersexes and sex reversals have relaxed the rigidly mechanical explanation which somehow become current, and have considerably enhanced the value of the genetic and physiological as distinct from the purely morphological explanation. Sex, like other genetic characters, turns out to be the resultant of many forces originating both within and without the organism, and after the original direction is given by a gene complex, its developmental history may be altered by various factors. The gene explanation is satisfactorily applied to most of the evidence on sex, but it is as yet impossible to become too confident of this hypothesis while such refractory cases as that of the honey bee remain unexplained.

The points of view adopted on this as on many of the questions in the book appear to be less fixed than they were a few years ago. The conclusions are few and specific and occupy only ten as compared to some three hundred odd pages. Even the interpretation of this evidence and its relation to the general theory is reduced to a minimum which is sometimes so scant as to leave the general reader waiting for a statement which may relate the effect of ovariotomy in birds, for example, to the theory of the gene.

To the biologist, however, this book will appear as an excellent illustration of the superiority of the modern over the older way of building a theory of inheritance, and as at once a partial fruition and justification of an arduous method which depends wholly on de-

tailed and controlled experiment and observation.

To such a reader, the book likewise will stand as a convenient milepost by which to measure the recent progress of genetics under this method. He will find it most illuminating to compare it with two previous books by Morgan and his associates. Even the titles of these books provide an interesting insight into the steps by which this central theory of genetics has arisen. In "The Mechanism of Mendelian Heredity" (1915) Morgan, Sturtevant, Muller, and Bridges first exhibited the quality of the metal from the new mine they had discovered—Drosophila. They proposed one mechanism of heredity, for one rather limited set of factors, those which were found in Drosophila, and which behaved in accordance with Mendel's law of segregation. This mechanism consisted of the chromosomes, and while some attempt was made to apply the chromosome theory to other facts from experimental breeding and cytology, the chief new interest lay in the mechanism and in Drosophila. Four years later this theory of a mechanism had broadened into "The Physical Basis of Heredity" and Morgan was by then prepared to state that "Since 1900, four other principles have been added (to Mendel's original principles of segregation and independent assortment). These are known as linkage, the linear order of the genes, interference and the limitation of the linkage groups." The details of the mechanism had been more thoroughly worked out and appeared to be of such general significance as to be worthy of consideration as not merely one but four new principles of inheritance. These related chiefly to the details of the mechanism of inheritance, although in this book to a greater extent than in the former, the purely morphological aspects of the theory were more closely assimilated to the developmental history of the individual and, in the stimulating final chapters, to theories of mutation and species formation. Now, in 1926, appears "The Theory of the Gene" at once more specific and more general than any of the statements of the same theory that had preceded it. The titles af all three of these books are, in the sense in which they have been employed, synonymous. They illustrate the narrowing of the conception of inheritance formulated by the authors of these books and its present focus on one or a few fundamental and essentially simple principles, reached through a mass of piled up complexities which many biologists predicted would cause the whole structure to fall of its own weight. The progress shown is from the particular and diffuse conception of a complex mechanism to a general and more comprehensive appreciation of the single part of this mechanism that really matters—the gene. There has been shown increasing confidence, justified by the evidence, in the few fundamentals, and decreasing confidence and tendency to dogmatize concerning the mechanical details of the explanation—e. g. in the items of crossing over and in the determination of sex. The theory of the gene has shown itself of ample flexibility, chiefly because it has become more nearly an ideal or abstraction, to accommodate itself to changing evidence. It might even survive the collapse of the chromosomes altogether. All this indicates that, as a principle, the theory of the gene or of inheritance by discrete units is as secure as any scientific theory is likely to be, and is ready to take its place as one of the major generalizations of biology.

L. C. Dunn

PERSIAN AND MERINO SHEEP CROSSES*

JOSEPH BURTT DAVY

Formerly Chief of the Division of Botany, Department of Agriculture, Union of South Africa

FOR some years the writer maintained a small flock of sheep at the Botanical Experiment Station of the Department of Agriculture, Union of South Africa, at Pretoria, Transvaal, for the purpose of testing the palatability of the various sorts of grasses cultivated there.

Pure-bred Persian sheep were used first, as being better suited than Merinos to that part of the country. The very distinctive characters of the Persian, as compared with the Merino, suggested their possible value for an investigation of the manner of transmittal of those characters, and the writer therefore decided to attempt a cross between the two breeds. The experiment was continued on a larger scale at the writer's Seed Farms and Maize-breeding Station near Vereeniging, but had to be abandoned when the work of the farms increased to such an extent that the personal attention of the management could no longer be given to it. Publication of the results was delayed, in the expectation that the experiment would be repeated and carried to a definite conclusion, and with a sufficient number of animals to furnish statistical data; as this has not proved practicable, the writer has been asked to publish the results so far obtained, in the hope that they may encourage some one to introduce this cross into the Southwestern United States, where it is likely to prove of range value.

The investigation was undertaken from philosophical motives, purely, but as is the case with much (may we not safely say, *most?*) scientific work, it has produced results of some practical value. The object sought was to find out: (1) which of the distinctive characters of each breed may be segregated in transmittal; (2) in what manner they are transmitted; (3) what type or progeny is produced; (4) what new combination of characters could be effected by crossing; (5) how they could be fixed. It seemed probable, also, that these crosses might throw some light on the origin of the various types of "bastard" sheep now found in South Africa.

Parentage of Crosses

The crosses made were between Merino ewes and a Persian ram; the reciprocal cross was also made.

PERSIAN:—These were originally obtained from Mr. F. Struben, Tafelberg, Cape Province, South Africa, who has specialized in pure-bred Persians. They had been bred for several seasons at the Botanical Experiment Station, Pretoria, before any crossing was attempted; during that time they always bred true.

MERINOS:—These were obtained from the Stud Flock of pure-bred Merinos maintained at the Government Sheep Stud-farm, Ermelo, Transvaal, and were culled by Mr. Malleson, Government Flock-master. A Merino ram generously donated by Mr. J. R. Buhrmann, a merino breeder, was used at a later stage, but was not one of the original parents.

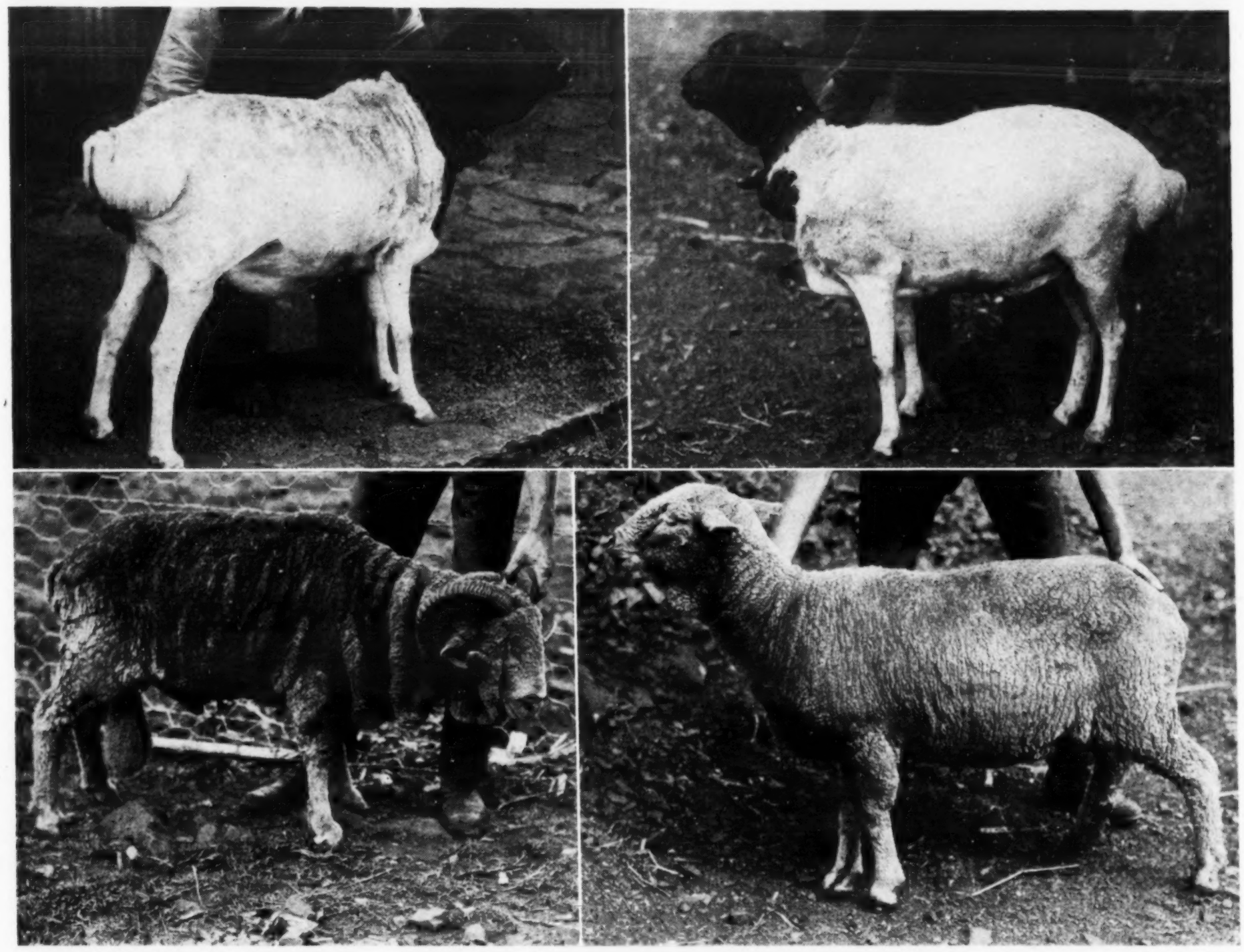
Salient Features of Parents

Persian Parents (*Figure* 8)

HORNS: Absent; in the ram there are two hard horny areas, bare of skin, where the horn would have been found, if present. The head is quite as formidable a weapon of offense and defense, as if it had horns. I have seen native herd-boys knocked flat by a

*Read before the South African Association for the Advancement of Science, (Pretoria Meeting, 1915).

PERSIAN



MERINO

PERSIAN AND MERINO BREEDS CONTRASTED

Figure 8

The differences are discussed in detail in the text. The most striking peculiarity of the Persian sheep is the tail, a broad flap, containing a large quantity of fat. They differ also from the Merino in having hair instead of wool, and in having no horns.

"butt," and have myself been lamed for days by one blow from this powerful "battering ram."

COLOR: White predominates; head, neck and upper half of dewlap jet black save for a broken touch of white around nostrils and mouth; feet white; a few white hairs are sprinkled among the black; remainder of body entirely white.

TAIL: The tail is remarkable and characteristic; the base of the tail (approximately one-third of its length) is enormously developed in breadth and thickness, completely covering the vents; the portion of the tail contains a mass of fat which appears to act as a store of reserve-material, and which is "rendered out" and used by the South African sheep farmer as a substitute for butter. Below the fat portion, the tail thins perceptibly and turns abruptly upward for a short distance (about a third of its length) when it again becomes perceptibly thinner, and turns sharply downwards the three lengths thus forming a zig-zag (See Figure 8).

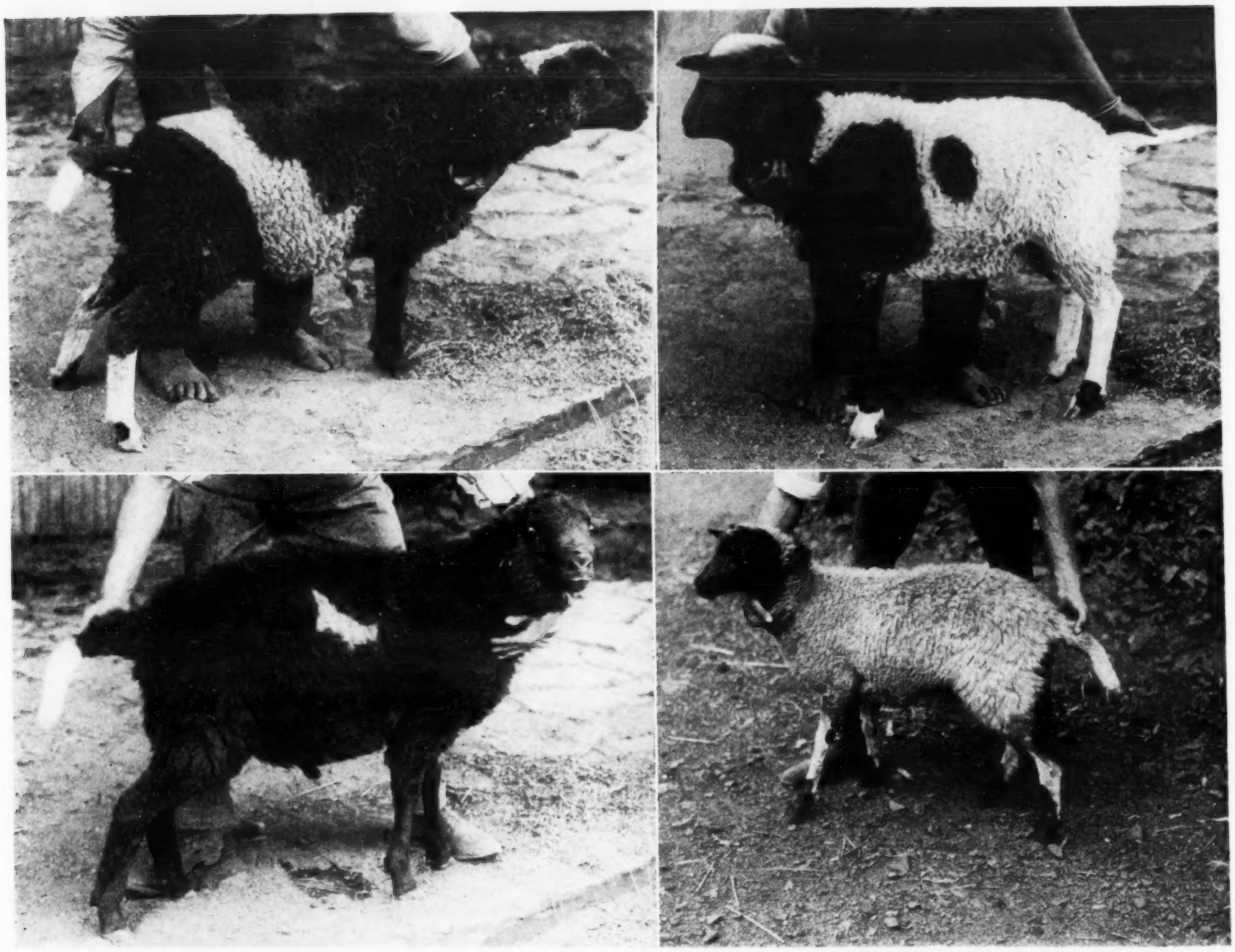
LEGS: These are longer and finer than in the Merino.

EARS: These are small and fine.

HEAD AND FACE: There are definite (though indescribable) characteristic features about the head and face, which invariably enable one to recognize a Persian sheep when one sees it.

COVERING: The Persian is clothed with stiff, short *hair,* becoming longer in winter. Among the hairs there is a little short wool, which is extremely fine in character.

NECK WRINKLES: There is no sign of neck wrinkles such as are commonly seen on the Merino.



Lamb No. 1 | Lamb No. 3

Lamb No. 5 | Lamb No. 6

FIRST GENERATION HYBRIDS

Figure 9

The cross shows that neither breed is prepotent. The merino tail appears dominant, and black color is more widely distributed than in either parent. All of the hybrids were wooled, though the quality varied considerably.

Merino Parents

HORNS: Long and curved in the ram (Figure 8); usually absent in the ewe; Mr. Malleson, late Flock-master of the Transvaal Department of Agriculture, informed me that horns are present in a small percentage of South African Merino ewes; he estimated the number, roughly, at about 5 per cent.

COLOR: Black pigment entirely absent.

TAIL: Thin and straight; there is no tendency toward the development of fat such as occurs in the Persian.

LEGS: Shorter and coarser than in the Persian.

EARS: Large and coarse.

HEAD AND FACE: Coarser and with features different from those of the Persian.

COVERING: Characteristically well covered with close, fine, short wool; in well-bred animals this covers the face and legs nearly down to the feet.

NECK WRINKLES: Very deeply folded in the ram; variable in the ewes, in some being almost absent.

The F_1 Progeny

Eight lambs of the F_1 generation were obtained, as described below, 5 being ewes and 3 rams:

Parents	Lambs	
	♀	♂
Per. ♀ × Mer. ♂	4	1
Per. ♂ × Mer. ♀	1	2
Total	5	3

CHARACTERS OF F^1 PROGENY

Lamb No. 1 (*Figure* 9)

PARENTAGE: Out of Persian ewe by Merino ram.

SEX: Ewe.

HORNS: Absent.
COLOR: Black predominates; white band across loin; some white on hind legs; lower half of tail white; large spot of white on top of head; remainder black.
TAIL: Thin (Merino type).
LEGS: Resemble Persian, but the bone appears to be slightly larger.
FACE AND EARS: Resemble Persian.
COVERING: Wool predominates, with thin sprinkling of hair among it; wool coarse, 1½-inch long; hair predominates on lower portion of tail, and on front legs from just above knee; on the hind legs there is a small quantity of wool below the hocks; wool extends down the face to between the eyes.

Lamb No. 2

PARENTAGE: Out of Persian ewe by Merino ram.
SEX: Ewe.
HORNS: Absent.
COLOR: Rather more black than white; fore-end black to middle of back with exception of a small spot on top of head; from middle of back and left side to tail white; left thigh white; tail white with black round base, some white on hind legs; remainder black.
TAIL: Thin (Merino type).
LEGS: Bone similar to Persian.
FACE: Similar to Persian.
EARS: Very slightly coarser than Persian.
COVERING: Wooled as in No. 1.

Lamb No. 3

PARENTAGE: Out of Persian ewe by Merino ram.
SEX: Ewe.
HORNS: Absent.
COLOR: Approximately half white and half black; back and right side, top of head, back of neck, lower half of tail and right hind leg down to fetlock, white; remainder black.
TAIL: Thin (Merino type).
LEGS: As in No. 1.
FACE AND EARS: Resemble Persian.
COVERING: Wool predominates, with thin sprinkling of hair among it; hair predominates on lower portion of tail and on legs below the knee.

Lamb No. 4

(*Figure* 9)

PARENTAGE: Out of Persian ewe by Merino ram.
SEX: Ewe.
HORNS: Absent.
COLOR: Mostly white; neck and head black with exception of small white spot on top of head; black spot on either shoulder; remainder white.
TAIL: Thin (Merino type).
LEGS: As in No. 1.
FACE AND EARS: Resembling Persian.
COVERING: Wool predominates, with thin sprinkling of hair among it; hair predominates on lower portion of tail and on legs below the knee.

Lamb No. 5

(*Figure* 9)

PARENTAGE: Out of Persian ewe by Merino ram.
SEX: Ram.
HORNS: Absent (did not develop in age).
COLOR: All black except for small spots of white on top of head, right side and left hip; lower half of tail white.
TAIL: Thin (Merino type).
LEGS: As in No. 1.
FACE AND EARS: Resembling Persian.
COVERING: Wool predominates, with thin sprinkling of hair among it; hair predominates on lower portion of tail; hair on legs below knee, but some wool on back of hind-legs below knee.

Lamb No. 6

(*Figure* 9)

PARENTAGE: Out of Merino ewe, by Persian ram.
SEX: Ewe.
HORNS: Absent (did not develop in age).
COLOR: Mostly white; face and throat black; black under tail; 4 black feet; small black spot behind each hock and behind each knee.
TAIL: Thin (Merino type).
FACE AND EARS: Resembling Persian.
COVERING: Wool predominates, with thin sprinkling of hair among it; hair predominates on lower portion of tail; hair on legs from well above knee; wool extends over forehead to below the eyes.

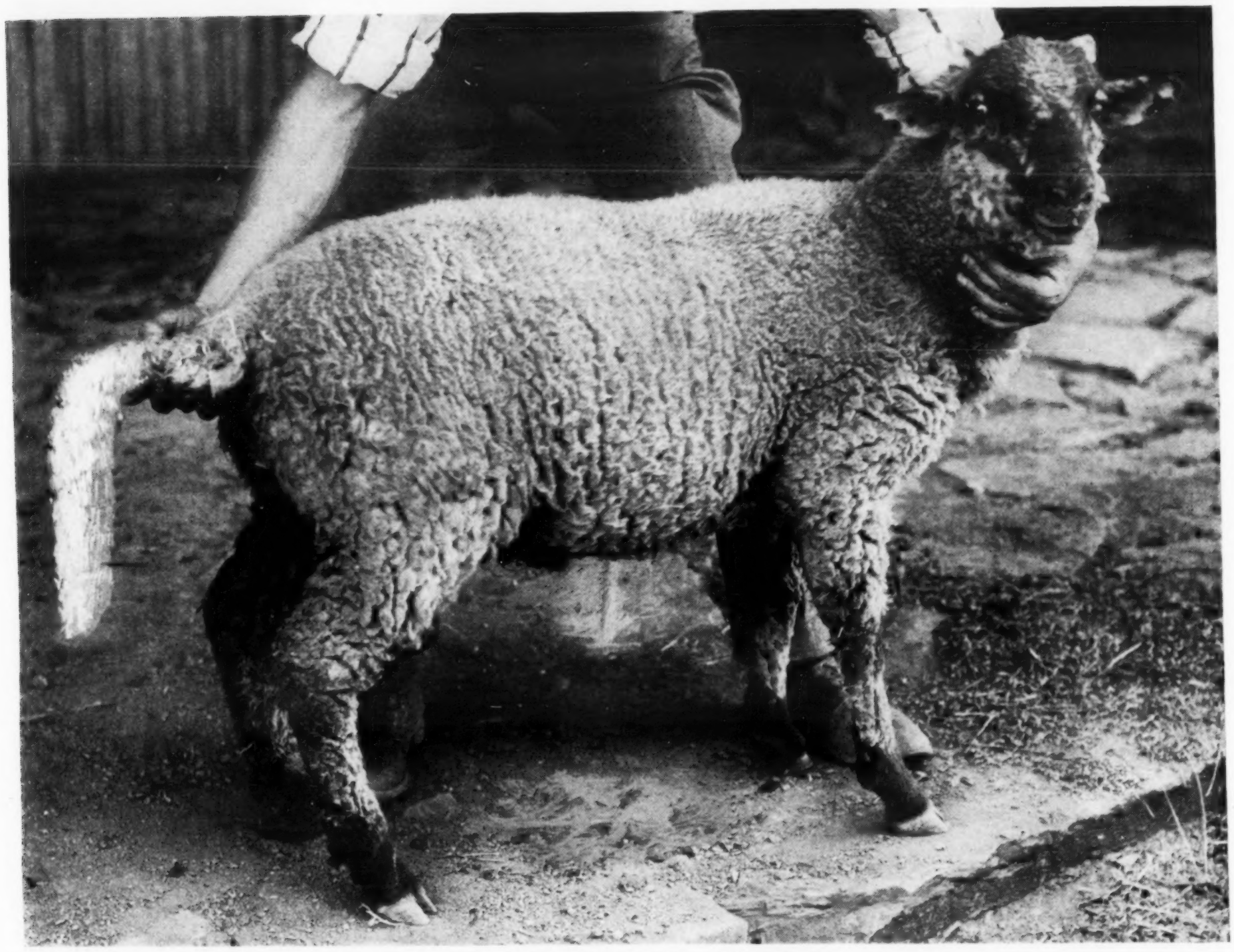
Lamb No. 7

PARENTAGE: Out of Merino ewe by Persian ram.
SEX: Ram.
HORNS: Absent (did not develop in age).
COLOR: Mostly white; head, neck, shoulders and forelegs black with exception of small white spot on top of head and white spot on each forefoot; remainder white.
TAIL: Thin (Merino type).
FACE AND EARS: Resembling Persian.
COVERING: Wool predominates, with thin sprinkling of hair among it; hair predominates on lower portion of tail; hair on legs below the knee.

Lamb No. 8

(*Figure* 10)

PARENTAGE: Out of Merino ewe by Persian ram.
SEX: Ram.



AN EXCEPTIONAL HYBRID
Figure 10

This ram (No. 8 of the tables) was the only one of the hybrids to develop horns, and in other characteristics resembled a Merino much more than a Persian. It seems probable that in this cross individuals would be found combining the desirable characteristics of the two breeds, and that from them could be selected a strain which would be of great value in arid regions.

HORNS: Well-developed in age.

COLOR: Mostly white; black speckled face; black feet and part of fore-legs.

TAIL: Thin, longer than in the others and covered with wool.

HEAD AND LEGS: Large-boned.

EARS: Larger and coarser than Persian; resemble Merino in size.

FACE: More like Merino than in the others.

COVERING: Resembles a wooled sheep much more than the other lambs; wool much predominates; tail wooled; legs wooled below knees and hocks; quality of wool rather better than in other crosses. In age this ram developed a strong fringe of coarse, dark hair down the dewlap.

WRINKLES ON NECK: Not developed.

N. B.—This developed into a very large ram, with large, curved horns. It differed from any other lamb produced in the course of the experiments. Unfortunately the mother died, preventing any other breeding tests.

Dominance in the F_1 Generation

The following characters were found to be dominant in the F_1 generation, in seven of the eight lambs, and some of them (indicated by the Figure 8), in all of the eight. The numbers indicate the number of lambs in which the particular character was present.

Characters derived from the Persian parents:

Presence of black pigment (8).
Absence of horns (7).
Absence of wrinkles on neck (8).
Ears small and fine (7).
Predominance of hair on lower part of tail (7).
Face characters (7).

Characters derived from the Merino parents:

White patch on top of head (8).
Tail thin and straight (8).
Bones of legs (8).

Characters unlike either parent:

Extension of black pigment to parts of body and legs (8).
Coarser wool (8).
Tail, part with wool preponderating and part (the lower third) with hair predominating (7).

Apparent Allelomorphs

	Dominant	Recessive
Color	Presence of black pigment (Persian)	Absence of any blackness (Merino)
	White spot on top of head (Merino)	Absence of white spot on top of head (Persian)
Horns	Absence of horns, or horns rudimentary (Persian ram and ewe, Merino ewe)	Presence of horns (Merino ram)
Ears	Small and fine (Persian)	Large coarse ears (Merino)
Tail	Thin and straight (Merino)	Fat and hooked (Persian)
Covering	Wooliness (Merino)	Hairiness (Persian)
	Preponderance of hair on lower part of tail (Persian)	Wool on lower part of tail (Merino)

The F_2 Generation Crossbred

The number of F_2 crossbreds is too limited to furnish material for a full report on the F_2 generation.

The F_1 ewes were mated with F_1 rams of the reciprocal cross. The results obtained, as far as they have been followed out, are in accordance with Mendelian Segregation of Unit Characters.

As regards color, segregation of the black and white parental type occurs, black pigment being confined to the head and neck as in the Persian parent. All-white segregates (as in the other parent) also occur; in the one case observed, the frame and covering differ from those of the Merino parent. A third type, the all-black, occurs with, apparently, more frequency than either. A proportion of the F_2 generation crosses resembles the F_1 cross, but the number of individuals obtained is too small to enable us to draw conclusions from the percentages.

Conclusions

The outstanding conclusions drawn from the experiment are: (1) that some of the characters of *each* parent are dominant in the F_1 generation; (2) that the same characters are dominant in both the direct and the reciprocal crosses; (3) that Mendelian segregation and re-combination of unit characters takes place.

These facts show clearly that—in this case at least—neither breed is *prepotent* in the sense in which the

SUMMARY OF CHARACTERS RECORDED
(A=absent; P=present)

	P-1 Persian		P-1 Merino		F-1 ex Merino Ram					F-1 ex Persian Ram		
Number assigned to progeny					1	2	3	4	5	6	7	8
Sex	♀	♂	♀	♂	♀	♀	♀	♀	♂	♀	♂	♂
Horns	A	A	A*	P	A	A	A	A	A	A	A	P
Black pigment present	P	P	A	A	P	P	P	P	P	P	P	P
White color present	P	P	P	P	P	P	P	P	P	P	P	P
Predominating color	White	White	White	White	Black	Black	Half Each	White	Black	White	White	White
Tail	Fat	Fat	Thin	Thin	Thin	Thin	Thin	Thin	Thin	Thin	Thin	Thin
Ears	Fine	Fine	Coarse	Coarse	Fine	Fine	Fine	Fine	Fine	Fine	Fine	Medium
Wool	A	A	P	P	P	P	P	P	P	P	P	P
Lower part of tail (different from upper)	P	P	A	A	P	P	P	P	P	P	P	P
Leg bones large	A	A	P	P	A	P	P	P	P	P	P	P
Face resembles	Persian	Persian	Merino	Merino	Persian	Persian	Persian	Persian	Persian	Persian	Persian	Merino
Wrinkled neck	A	A	Not strongly developed	Very strongly developed	A	A	A	A	A	A	A	A
Size			Larger than parents							Larger than parents		
Wool character	Hair predominant		Wool predominant		Wool predominant	Wool predominant	Hair pre.	Hair pre.	Wool pre. curly	Hair pre.	Mixed	Nearly pure wool

*Horns are present in a small percentage of South African Merino ewes.

term is popularly accepted. They suggest the possibility, however, that crosses might occur in which there were more dominant characters in one parent than in another, thus conveying the impression of "prepotency."

They also throw light on the question of blending in inheritance. In these crosses a certain amount of "blending" (as the term seems frequently to be understood) has taken place; but on analysis we find that it consists of the bringing together of the separate dominant characters of the two parents and—presumably—the consequent latency of the recessive characters of each.

The occurrence of black pigment in all the F_1 progeny is noteworthy, and its distribution over the body in a way not seen in either parent, is interesting. This patchy body-distribution of black pigment is common in flocks of "Cape" or "bastard" sheep, and our results suggest a possible origin for it.

HORNS: The writer has neither seen nor heard of a horned Persian. Merino rams are usually—if not always—horned, but the ewes are usually devoid of horns. A few horned ewes are often met with in Merino flocks—possibly five per cent. The horns of ewes are smaller than those of rams. Breeders sometimes break off the horns of ewes intended for sale. In merinos the horns of rams grow slowly until the animal is mature; if castration is performed, further growth of the horn is stopped. Horned ewes are said by some to have better constitutions than the hornless. Only one (a ram, No. 8) of the F_1 generation is horned.

WOOL: All the F_1 progeny are wooled, but the wool contains an admixture of hair in each case, though No. 8 produced almost pure wool.

TAIL: The fatty deposit, and the two bends in the tail of the Persian are entirely absent in the F_1, but the last third of the tail is hairy as in the Persian, in all but No. 8.

EARS: The fine ears of the Persian are produced in the F_1 progeny, except in No. 8.

WRINKLED NECK: The wrinkled neck of the Merino does not appear even in the rams of the F_1 generation.

SIZE: Increased size is very noticeable in the progeny of this cross, and they make good mutton sheep.

WOOL: The F_1 animals produce quite an appreciable amount of wool of fair quality, suitable for certain classes of manufacture, and in this respect also, are more valuable than the Persian parent.

MANE: A mane of coarse, dark hair sometimes develops on the dewlap of the F_1 ram.

RECIPROCAL CROSS: No difference was noticed between the progeny of the direct and the reciprocal crosses, in the F_1 generation.

I wish to record my deep indebtedness to my Assistant, the late Mr. G. J. Goodwin, by whom the photographs were taken, and to whose conscientious assistance in preventing accidental crossing and in keeping the records, I am indebted for the success of the experiment.

The ability of the pure-bred Persian sheep to thrive in arid countries, subject to great heat and a long dry period, suggests its suitability for sheep ranching in parts of the Southwestern States. But its lack of wool, and comparatively small carcass, are disadvantageous. The F_1 generation of the cross described above, shows such a marked improvement over the original Persian in that a proportion of the animals produce wool instead of hair, and all of them show an appreciable increase in size of carcass, that it would be well worth a thorough trial in the Southwest, where conditions of climate and vegetation are very similar to those prevailing on the high plateau of Central South Africa. By mating only wooled F_1 cross-breds it is probable that a homozygous wooled type would be produced in due time.

THE PRESERVATION OF NATURAL MONUMENTS IN JAPAN

M. MIYOSHI
Imperial University, Tokyo, Japan

"THE BEAUTIFUL PINE"
Figure 11

The beautiful pine is so called because of the symetrical umbrella-like shape of the tree. It is a form of the red pine of Japan, and is found only in this one grove near Hiramatsu in the Province of Omi.

OWING to the development of industry and the intensive use of land in recent times the existence of natural monuments is threatened in Japan as in other countries.

To rescue these national treasures from devastation a resolution for the preservation of natural monuments as well as historical relics was passed by the parliament in 1912. The aim of the resolution was finally fulfilled after seven years, when the law for preserving scenic, historical and natural monuments was promulgated in 1919.

Following is an english translation of the text of the law:

THE LAW RELATIVE TO THE PRESERVATION OF SCENIC, HISTORICAL AND NATURAL MONUMENTS IN JAPAN (LAW NO. 44, OF 1919)

Article I. The scenic, historical and natural manuments subject to the present law shall be designated by the Minister of Home Affairs.

Before the ministerial designation the provincial governor may, if there is occasion, designate them provisionally.

Article II. Before or after the designation, according to the preceeding article, competent officials may enter upon the lands

FOREST OF WEEPING CHESTNUTS AFTER A SNOWSTORM

Figure 12

The weeping chestnut occurs only in a few places in Japan. This grove near Tenguhara is one of the largest in Japan. The snow on the ground throws the trees into relief and gives an excellent idea of their form.

which are concerned, or upon the adjoining lands, and excavate these lands, remove encumbrances from these lands, and carry out upon them all other actions that are necessary for the investigation of the scenic, historical and natural monuments.

Article III. If the owners of the lands or objects concerning the scenic, historical and natural monuments wish to change their present condition or to carry out any action influencing their preservation they must obtain the permission of the provincial governor.

Article IV. In order to preserve scenic, historical and natural monuments the Minister of Home Affairs may inside of a limited zone prohibit or restrict designated actions and order necessary measures to be taken.

If any orders or acts prescribed in the preceding paragraph or actions taken pursuant to Article II have caused damages to individuals the State shall indemnify them according to ordinance.

Article V. The Minister of Home Affairs may cause the scenic, historical and natural monuments to be administered by designated districts or communes.

The necessary costs of such administration are to be met by the districts or communes concerned.

The State can, nevertheless, pay a part of these costs.

Article VI. Those who violate the provisions of Article IV shall be punished by imprisonment not more than for six months or by a fine of not over 100 Yen ($50.00).

ANNEXED REGULATIONS

Whatever is necessary for the execution of the present law shall be done by ordinance.

The date when this law goes into effect shall be specified by ordinance.

Article 19 of the law relative to the preservation of old shrines and temples shall be abrogated after the date when the present law goes into effect.

DECREE NO. 261 OF 1919

The law relative to the preservation of the scenic, historical, and natural monuments shall go into effect after June 1, 1919.

Since that time, a survey of natural monuments and others has been made throughout the country, and these are classified according to the list of objects to be preserved.*

The total number of natural monuments, which have been designated by the minister of home affairs and preserved by law, is at present 207 among which 24 are zoological, 164 botanical and 19 geological and mineralogical objects.

In the following I will describe only a few examples of botanical natural monuments already protected.

I. Remarkable Monstrosities in Wild Plants

1. *Forest of Weeping Chestnuts at Tenguhara, Province of Shinano*

Although trees with pendant branches are not rare among cultivated cherries, willows, pines, plums, etc., they are very seldom found under wild conditions. For this reason the above mentioned forest of weeping chestnuts is interesting from the teratological point of view.

The weeping chestnut, *Castanea pubinervis* C. Schn. var *pendula* Miyos. occurs only in a few districts in Central and Northern Japan. One of the well known localities is Tenguhara, where the trees form a forest on one side of a hill.[1] The accompanying photograph (Figure 12) gives a view of the forest after a snowstorm, showing the weeping form of the trees very clearly.

In weeping cherries and willows the branches are slender and graceful, in the weeping chestnut, on the contrary, the branches are strong and curve downwards often assuming tortuous forms. The number of nuts varies from two to seven, usually 3, contained in a cup.

A number of young trees raised from the seed in 1919 showed at first, as has been reported[2] a more or less pendulous form. Now after six years some of them have died out, the survivors are mostly of a weeping habit with some few normal trees.

No doubt the weeping chestnut originated from the normal one as the two types are usually found together.

2. *Weeping Cercidiphyllum*

Another curious instance of a weeping tree is *Cercidiphyllum japonicum* S. et. Z. var. *pendula* Miyos. Only a few specimens of the tree exist in certain private gardens of Morioka and also in a Buddhist temple, Ryugenji, in the same district of the town. Long slender branches curving down at acute angles near attaching points, and almost

*LIST OF PRINCIPAL OBJECTS OF BOTANICAL NATURAL MONUMENTS

1. Groves of shrines, remarkable avenue of trees, famous trees, large trees, old trees.
2. Typical primeval forests, rare forest forms.
3. Typical alpine vegetation.
4. Habitats of rare plants.
5. Boundaries of natural distributions of remarkable plants.
6. Rare original habitats of cultivated plants.
7. Wild plants showing remarkable monstrosities.
8. Plants on the point of being exterminated.
9. Rare species of aquatic plants, mosses, liverworts, lichens, and algae in ponds, lakes, rivers and seas.
10. Caves and waterfall basins where characteristic plants are found.
11. Peat bogs with typical turf producing plants.
12. Sand dunes with sand-binding plants.
13. Thermal springs where characteristic lower plants (algae and bacteria) are found abundantly.
14. Typical meadow plant formations.
15. Grounds where orchids, ferns, lycopods, twining plans, mosses and lichens grow luxuriantly or trees upon which these plants grow together.
16. Off-shore islets possessing a peculiar flora.
17. Rare useful wild plants.

WEEPING CHESTNUT SEEDLINGS

Figure 13

Seedlings of this curious form of Chestnut are mostly of the weeping habit of growth, with some normal plants. The branches of the weeping Chestnut are relatively short and thick, in contrast to the long branches of weeping willows and other plants of a pendulous character.

reaching the ground give the tree a peculiar cylindrical form.

It is said that all of these trees are descendents from a pendulous ancestor, which once stood in a forest of *Cercidiphyllum japonicum* in the same district. This original tree was removed to Ryugenji where it has been propagated by layering.

3. *Jointed Torreya*

Some interesting anomalies have recently been found among the genus Torreya. One of the most remarkable is *T. nuda* Miyos.[3] in which the inner hard shell of the fruit is lacking.

Jointed Torreya, *T. nucifera* S. et Z. var. *articulata* Miyos. is another remarkable example with abnormally arranged branches. A short diagnosis published in 1921[4] is as follows:

"Some annual shoots with inverted leaves. Such an abnormal shoot is attached at the end of a normal one, or inserted between two normals, so that the branch looks as if articulated."

An old "sacred" tree of the jointed Torreya is kept in the Buddhist temple Ryogenan, Echigo Province. The origin of this tree was not known until I found by inquiry that it has been transplanted from a mountain not far from the temple.

It was later established that the jointed Torreya does grow wild in the

A CURIOUS PARASITIC PLANT

Figure 14

Mitrastemon yamamotoi growing on the roots of *Pasania cuspidata*. This shows the peculiar nipple-like flowers which are produced in December.

mountain together with the normal form of *T. nucifera*.

This natural habitat as well as the old tree in the temple are now preserved as natural monuments.

Physiological experiments on the jointed Torreya are being carried on and will be reported in the future.

II. Rare Plants

1. *Mitrastemon yamamotoi* Mak.

This is a species of Mitrastemonaceae, allied to Rafflesiaceae, growing parasitically in a great number on the roots of *Pasania cuspidata* Oerst. It was discovered by H. Yamamoto in 1907 and named by Makino.[5]

When fully grown the stem is only a few centimeters high of a woody consistence and with a nipple-like terminal flower. Leaves are scaly and the whole plant is light brown. Flowers are produced in December and secrete an abundance of nectar which is consumed by Fosterops and other birds.

The curious parasitic plant occurs only in some parts of Southern Kyushu and Shikoku. A larger form of this species has afterwards been discovered in Formosa.[6]

The habitat of *Mitrastemon Yamamotoi* in the grove of a shrine at Yunomoto Province of Satsuma is now preserved.

2. *"Utsukushimatsu" (beautiful pine)*

The "Beautiful Pine" of Hiramatsu is so called from the symmetrical umbrella-like form of the tree. It resembles in some respects a tagyosho* *Pinus densiflora* S. et Z. var. *umbraculifera* Mayer, a much branched pine tree, commonly planted in Japanese gardens.

Utsukushimatsu may be regarded as a variety of red pine, *Pinus densiflora* with the following diagnosis:

*The Tagyosho is produced by grafting a scion of *Pinus densiflora* upon the stock of *P. Thunbergii*.

BRANCH OF JOINTED TORREYA

Figure 15

In this peculiar variety the shoots at the tips of the branches bear inverted leaves,—note how the lower side of the leaves shows in these shoots. Such branches occur not only at the tip, but also between two normal branches.

Pinus densiflora, S. et Z. var. *formosa* Miyos.

Small tree. Stem about 1-7 m. high, branches in clusters, so as to give the crown a compact umbrella-like form. Needles slender, cones small, conically round.

Distinguished from the red pine by more slender needles, smaller cones and especially by the form of tree, from the *tagyosho* by the taller trunk and occurrence in the wild state.

Hab. Hiramatsu, Province of Omi.
Nom. jap. Utsukushimatsu.

The only habitat of *utsukushimatsu* is the above mentioned locality where it is grown on one side of a hill, forming a genuine forest. The other sides of the hill as well as the surrounding mountains are covered by red pine.

There is no evidence with regard to the origin of *utsukushimatsu.* Though there is reason to believe, that the stony soil (of horn stone) of the spot, where the pine trees grow, might influence the growth of the trees in such a way as to cause them to assume the peculiar form, yet it is probable on the other hand, that this beautiful pine originated by mutation from the common red pine and thereafter multiplied itself by seed.

Several seedings of 1923, now about 50 cm. high are already much branched. I expect that the young plants will grow up in course of time and take the same form of crown as the parent plants.

Utsukushimatsu was famous in past times. Its above mentioned habitat is described with illustrations in a series of "Meisho-dzuye," i. e., geographical picture books, published more than 100 years ago. The well known author of these Meisho-dzuye, Akizato Rito, himself visited the locality and admired the beautiful form of the pine trees.

Fortunately the unique pine forest remained to-day almost unaltered and has now been preserved as a natural monument.

I shall also describe briefly those botanical natural monuments which have just recently been preserved (February, 1926).

Primeval Forest of Mt. Fuji

The northern side of Mt. Fuji has an especially rich flora. It is this side that the magnificent forest of Aoki-gahara, known as "the sea of forest" is situated. The forest consists of *Tsuga sieboldi* Carr, which grows on lava produced by the eruption of Fuji more than 1,000 years ago.

The region now preserved is that part of the primeval forest stretching from the upper border of "the sea of forest" up to an altitude of 2,600 m. The lower region consists of broad leaved trees, the middle region of both broad leaved trees and conifers the upper region of conifers only.

Alpine Flora of Akita-Komagadake

Akita-komagadake is a lofty mountain standing in the back ground of Lake Tazawa. The hitherto almost untrodden ground of the mountain slopes displays a luxuriant growth of alpine plants. *Dicentra peregrina* Mak. var. *fusila* Mak. and *Pinguicula vulgaris* L. are especially abundant.

Alpine Vegetation at the Lava Tunnel at Nagahashiri in the Prefecture of Akita

While lava tunnels are usually situated at higher altitudes of mountains, that of Nagahashiri lies at the foot of a mountain and only about 160 m. above the sea.

The lava tunnel of Nagahashiri is formed by an underground heap of blocks of liparite and opens at several spots on the surface of the ground. In summer months a cold air current comes out from the openings and the surrounding ground is much cooled.

Within a small area around the openings there grow a number of alpine or subalpine species, such as *Vaccinium Vitis idea* L. *V. Buergeri* Miq., *V. hirsutum* Thunb. var. Smallii Max., *Cornus canadensis* L., *Pirola rotundifolia* L. var. *incarnata* J. C., *Ashlys japonica* Mak., *Rosa acicularis* Lindl.

var. *nipponensis* Hook f., species which otherwise grow at the altitude of about 300-900 m. in this district.

Outside the area the flora is quite different, consisting of species which are neither alpine nor subalpine, but those common to the low land of this district.

The average air temperature of Nagahashiri in the shade at 1 o'clock P. M. on the 27th of August, 1925, as I observed, was 33°C, while the temperature close to the surface of the ground where the alpine plants grew, was 10°C and that of the soil about 4 cm. deep was 9°C.

From this fact we see that the distribution of alpine plants depends upon the lower soil temperature in summer, even though the air temperature may be considerably higher.

Northern Limit of Distribution of the Tachibana

The only wild orange of Japan is the *tachibana*,* *Citrus Auranticum* L. var. *tachibana* Mak. distributed in Shikoku and Kyushu. It has recently been found that tachibana grows wild in Kasayama, a mountain projecting into the Japan Sea, in the prefecture of Yamaguchi. This new locality in the southern part of the Main Island of Japan is considered to be the northern limit of distribution of that wild orange.

Pine Tree of Senju

This is a large and beautiful tree of *Pinus Thunbergii* Parl. standing in the ground of a buddhist temple in the village of Gashu, Island of Awaji. The circumference of the stem at 1.5 m. above the ground is 7 m.

Avenue of Black Pines in the Island of Awaji

This avenue of *Pinus Thunbergii* Parl. is more than two and a half miles long, with about a thousand large trees. The largest of them measures 6.5 m. in circumference at breast height. This avenue is decidedly the most splendid of the pine tree avenues in Japan.

*For history of the Tachibana see TANAKA, T., Citrus Fruits of Japan. *Journal of Heredity*, Vol. 13, p. 247. June, 1923.

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NOTE:—Since this article was submitted for publication, the following article and book have been published: Preservation of Natural Monuments in Japan, issued by the Department of Home Affairs. 1926. Explanations of natural monuments (in Japanese), by M. Miyoshi. 1926. The Fusambo Publ. Co., Tokyo.

HERITABLE CHARACTERS OF MAIZE

XXVII—Colored Scutellum

G. F. SPRAGUE

Office of Cereal Crops and Diseases, Bureau of Plant Industry,
United States Department of Agriculture.

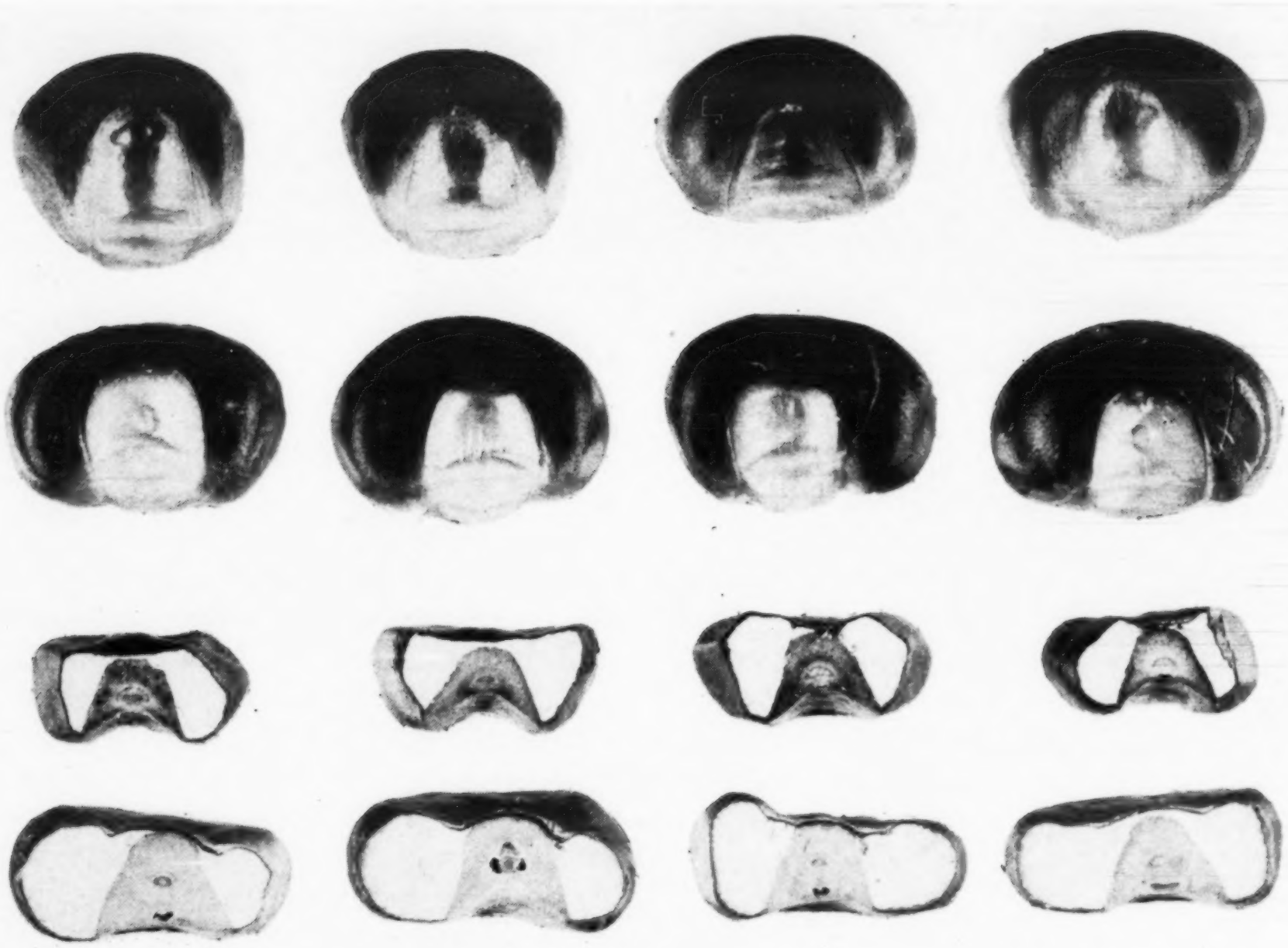
THE inheritance of color in various parts of the maize plant has been studied by a large number of workers. Factors for plant color have been reported for both seedlings and mature plants. In the kernel, heritable factors have been reported for color in the pericarp, aleurone, endosperm and, more recently, a factor has been reported for color in the plumule of the embryo. The purpose of this paper is to report on the inheritance of color in the scutellum of the corn kernel.

A single open-fertilized ear of Blue Flour corn was found in 1923, some of the kernels of which had purple scutellums. This same variety of corn had been grown on the North Platte Substation for several years, but purple scutellums had not been noted previous to this time. Since then, they have been found both in open- and self-fertilized strains of this variety.

In normal kernels of the Blue Flour variety, the entire germ is white, with occasionally a slight tinge of purple at the tip of the coleoptile. This latter coloration is more apparent when the coleoptile happens to be near the surface. In kernels having purple scutellums, the entire germ appears purple, as shown in Figure 16 (upper row). Upon cutting a cross section of the kernel through the embryo, however, it is found that only the scutellum is purple, whereas the embryo is white or occasionally has a purple tip to the coleoptile as in other kernels of this variety. Lying between the scutellum and the endosperm is a single layer of epithelial cells which are very similar in appearance to the layers of cells comprising the aleurone. The coloration includes this epthelial layer and at times may be confined to it exclusively.

The intensity and distribution of scutellum color varies greatly with different strains and even with different kernels on the same ear. The color may vary from very pale purple to almost black, depending somewhat on the intensity of the aleurone color. An ear with uniform aleurone color, however, may show considerable variation in the intensity of the color of the scutellum in different kernels. The distribution of color also varies. Usually the scutellum is colored uniformly throughout, but at times the pigmentation is more intense immediately surrounding the embryo, and at other times reaches its greatest intensity near the periphery.

Kernels with purple scutellums from the original ear were planted as a basis for a genetic study of this character. There were seven selfed ears from resulting plants which showed segregation into 3:1, 15:1 and 27:37 ratios, the proportion of kernels with purple scutellums being given first in each case. Kernels with purple scutellums were selected from ears segregating in each of these ratios. These were planted and selfs made to observe the behavior of this character in the next generation. That no 9:7 ratio was obtained from the original seed no doubt was due to the small number of selfed ears available for study, as it was obtained subsequently. The numbers of kernels with purple and with white scutellums on segregating ears in both seasons, together with



PURPLE SCUTELLUMS

Figure 16

Lateral and cross-sectional views of kernels showing purple scutellums (upper of each pair of rows) and white scutellums (lower of each pair of rows).

the numbers expected for the different ratios, are given in Table I.

For no individual ear is the deviation as much as three times the probable error and only three of the individual deviations exceed twice the error. The agreement therefore may be considered very good. At the same time, there is perhaps a suggestion that the deviations in the progenies approximating 9:7 and 15:1 ratios are not random. This is shown by the relatively larger deviations of the totals than of the individual progenies indicating a cumulative excess and deficiency of purple scutellums in the ears segregating in the 9:7 and 15:1 ratios respectively. Because of the few ears in each of these groups this can be considered only as suggestive pending the accumulation of further data.

The distribution of the second progeny ears on the basis of their segregation is shown in Table II, together with the expected distribution. A much larger number of individuals bred true than ordinarily would be expected. Kernels having the darker colored scutellums were selected for planting and this may have resulted in selecting a larger number of kernels homozygous for scutellum coloration than would occur in a random sample.

From the 27:37 ratio it is apparent that at least three factors are involved in the production of scutellum color which are similar in their interaction to the *A*, *C* and *R* factors for aleurone color.[1] The 15:1 ratio indicates that at least one and possibly two factors, different from those causing the 27:37 ratio, are also involved in producing scutellum color. More detailed breeding tests will be required to establish definitely whether or not the factors causing the 27:37 ratio are allelomor-

phic to the *A, C* and *R* factors. Ears segregating in this ratio for scutellum color may show uniform aleurone color but this cannot be taken as conclusive evidence of non-allelomorphism.

A large number of open-fertilized ears segregating for aleurone color have been examined and, previous to 1925, the colored scutellums noted were confined to kernels having colored aleurone. This suggested that possibly the factors responsible for aleurone color also were involved in scutellum coloration together with other factors which caused an extension of the pigmentation into the scutellum. In 1925, however, a single white kernel which possessed a purple scutellum was found. This would indicate that scutellum color is not entirely dependent on an extension of the aleurone pigmentation. It may even indicate that the series of factors for scutellum color is entirely different from the aleurone series, but closely linked to them.

Red and yellowish-brown scutellums have also been observed in the kernels of certain selfed ears. At present it is not known whether the yellowish-brown bears any relation to the *Bn* factor.[2]

Breeding tests are now under way to establish the identity and interaction of these different factors and to determine their linkage relation.

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TABLE I—THE OBSERVED AND EXPECTED NUMBERS OF KERNELS WITH PURPLE AND WITH WHITE SCUTELLUMS ON SELFED EARS OF MAIZE SEGREGATING FOR THIS CHARACTER

	NUMBERS OF KERNELS WITH:				
	Purple scutellums		*White scutellums*		*Dev.*
Ratio	*Observed*	*Expected*	*Observed*	*Expected*	*P.E.*[1]
3:1 Ratio					
	407	410	140	137	0.44
	332	324	100	108	1.32
	436	440	150	146	.57
	348	356	127	119	1.26
	340	337	110	113	.48
	400	394	125	131	.90
	233	238	84	79	.96
	373	362	110	121	1.71
	299	292	90	97	1.22
	326	320	101	107	.99
Total	3,494	3,473	1,137	1,158	1.06
9:7 Ratio					
	122	111	75	86	2.34
	231	214	149	166	2.61
Total	353	325	224	252	3.48
27:37 Ratio					
	259	264	366	361	.60
	230	238	334	326	1.01
	96	108	160	148	2.25
Total L	585	610	860	835	1.97
15:1 Ratio					
	354	360	30	24	1.88
	473	480	39	32	1.90
	344	350	29	23	1.90
Total	1.171	1,190	98	79	3.25

1. Probable errors taken from, "Tables of Probable Errors of Mendelian Ratios," prepared in the Department of Plant Breeding, Cornell University.

TABLE II—THE OBSERVED AND EXPECTED NUMBERS OF EARS SEGREGATING IN DIFFERENT RATIOS FOR KERNELS WITH PURPLE AND WHITE SCUTELLUMS

Ratio on parent ears	*Number of progeny ears with the ratio of purple to white scutellums stated*									
	All purple		3:1		9:7		27:37		15:1	
	Obs.	*Exp.*	*Obs.*	*Exp.*	*Obs.*	*Exp.*	*Obs.*	*Exp.*	*Obs.*	*Exp.*
3:1	5	2	1	4	.....	.....	.....	.....	.....	.....
27:37	2	0.37	4	2.22	2	4.44	2	2.96	.....	.....
15:1	9	5.13	1	2.93	.....	.....	.....	.....	1	2.93

Birth Control—Pro and Con

SELECTED ARTICLES ON BIRTH CONTROL *compiled by* J. E. JOHNSON. Pp. 364. Price $2.40. H. W. Wilson Co., New York, 1925.

It is amusing and a little alarming to consider the state of mind of a stranger to whom the subject of Birth Control was completely new, if he were presented with a copy of Johnson's book and had the time and energy to read it all carefully.

Page after page, paragraph after paragraph, that puzzled stranger would certainly ask, "But what are the contrivances by which Birth Control is produced? How can I make a decision without that knowledge?"

This book is presumably meant for people who have heard of Birth Control and who have not yet determined whether they are for or against. But, having read these pages how could they come to a decision if they were ignorant of the basis of the whole matter? If the enquirer hopes, after reading all these excellent speeches and quotations, to come to a conclusion about his own life, and in the matter people can decide about their own conduct and not about that of anyone else, he must feel very much like the gentleman who asked for a loaf and was given a stone.

Johnson unconsciously demonstrates how difficult is the way to truth. On both sides are ranged writers who are passionate upholders of truth, integrity, spirituality, human happiness, idealism, scientific knowledge and accuracy, and yet, they are on opposite sides, having reached diametrically opposite opinions after conscientious seeking. The writers are people who have reached responsible positions as a result of their efficiency and ability, yet they are on different sides. These people can differ so completely, although at the moment, the question of the rightness or wrongness of Birth Control is one of the most important subects about which human beings must come to a decision for this is one of the questions about which nobody can sit on the fence.

As a book from which to collect arguments for an academic discussion, from which to arrange data under the trinitarial heads usual in a debate, or, to gather the names of authoritative persons to use as the ammunition in heckling, this publication is very useful, but, it is quite useless as a means of turning the Birth-controllers out of the wide way of destruction into the Non-controllers' way of salvation where marital chastity and extended breeding are the shibboleths, or, on the contrary, as a means of guiding the Non-birth-controllers from their wild dash along the road to perdition where they lead a saintly life of self-control, into the path where the Birth-controllers save, by means of contrivances, their children from starvation and their nation from misery.

O. A. M.-H.

NEWS AND NOTES

Immigration in September, 1926

WOMEN outnumbered men in the homing migration of American travelers from abroad in September, this preponderance of women applying to both native and alien residents of the United States reentering the country. In recent years September has been a peak month for incoming passenger travel, and September, 1926, was no exception to this rule. During this month 71,268 United States citizens arrived from foreign countries, 39,742 being females and 31,526 males.

In the same month 60,977 aliens were admitted and 23,026 departed, the former comprising 35,297 immigrants and 25,680 non-immigrants and the latter 6,634 emigrants and 16,392 non-emigrants. This is an increase of both arrivals and departures over the previous month as well as over the corresponding period of 1925.

Of the 35,297 immigrant aliens, or newcomers for permanent residence in the United States, Canada, with 11,150, furnished the largest number, and Mexico, Germany, the Irish Free State, Italy, Scotland, England, Poland, and Sweden, in the order named, were the next largest contributors. Italy continues to lead all countries receiving emigrant aliens from the United States, 2,154, or about one-third of the total of 6,634 for the month, going to that country for future permanent residence. Less than 500 went to any one of the other countries during the same period.

The latest figures throw an interesting light upon the distribution of immigrant aliens by States. They show that the regulation of immigration by quotas has had the effect of scattering the new-comers more evenly throughout the country than before. There is no longer a rush to the congested cities of the East, but a marked drift to the Central West and to the States beyond the Rockies.

New York State still leads all others as the settling ground of the present-day immigration, but not by such a prodigious margin. For instance, during July, August, and September, 1926, there were only 20,302 immigrants who gave the Empire State as their destination, while 8,169 were recorded as leaving that State, a net balance of 12,133 for the three months, which by comparison with New York's share in former years seems amazingly small. Massachusetts received 8,813, and 2,026 left that State, a net balance of 6,787. Michigan received 8,813, and only 930 left that State, which gives Michigan a net gain of population by immigration proportionately greater that that for both New York and Massachusetts. Even Texas, considered usually as distinctively an agricultural State, received 11,963, with only 231 leaving, so that the Lone Star State, too, was not behind the above-mentioned Atlantic Coast States in proportionate net gain by immigration. Of the Pacific Coast States, California received 6,451 and Washington 1,439, while 1,336 left the former and 267 the latter. The Southern States, as usual, gained but little by immigration, Florida receiving the largest number, 799 going to that State and 293 leaving. South Carolina received fewest of all the States—with just 17 incoming and 5 outgoing in the three months.

Some interesting information is shown concerning the character of recent immigration. The net gain of skilled labor in July, August, and September last was 11,354, compared with only 8,631 in the corresponding months of last year. There was a net gain of 7,808 common laborers this year as

against a net loss of 1,871 last year. Net farm labor immigration amounted to 5,205 during the said three months of this year as compared with only 3,496 for the same period of 1925.

Of the alien applicants for admission to the United States at the seaports of entry during September, 1926, only eight out of every thousand were rejected for various causes under the general immigration laws. In this month 41,048 aliens sought entry at such ports and 338 of these were debarred, or eight-tenths of 1 per cent of the number applying. At points along the northern and southern land boundaries, 1,479 were rejected, making a total for the month of 1,817 aliens debarred at all ports. During the same month 885 aliens were deported from the United States under warrant proceedings, the principal causes for their deportation to the countries whence they came being: Entering without visa under the immigration act of 1924, mentally or physically defective, and criminal and immoral classes.—J. J. Kunna, Chief Statistician, U. S. Bureau of Immigration, in *Monthly Labor Review*, December, 1926.

The High Cost of Children

IT costs about $7,238 to rear a child from and including birth to the age of 18 years, according to the Metropolitan Life Insurance Company, which is making a series of studies on "the value of man" based on the approximate expenditures in dollars and cents for the growing child during the nonproductive period of life. This total is reached by adding to the initial "cost of being born," estimated at $250, the sums of $2,500 for food, $3,400 for clothing and shelter, $50 for education, minor items met by the individual family purse, $284 for health, $130 for recreation, $54 for insurance, and $570 for sundries. These figures are believed to be a fair representation of the money expended by a family, the father of which is in the $2,500 income class, in raising a child through its minority. A pecuniary measure for rating the income value of the personal services of the mother and other members of the family is lacking. No distinction has been made for sex, because the difference in amounts for girls and boys is relatively small. Major items of education hase been omitted because, according to the present system of public education, the parent here considered contributes comparatively little actual money toward the education of his children. Although he carries a share of the tax burdens in the rent he pays, etc., it cannot be determined even approximately just how much he actually spends in this direction.

From the standpoint of the community certain additional costs must be considered owing to the fact that not all children born survive. In order actually to raise 88,264 children to age eighteen, the community must bear the cost of the birth and partial rearing of a full complement of 100,000 children. The computation which must be charged for this item of mortality gives the sum of $185 up to the age of eighteen. Also, considering the money expended on the child as being kept from an interest bearing investment, the additional cost to be added to the original figure of $7,238 for interest charges is $2,624. Thus the total expense, making the proper allowance for deaths and for interest on capital, is $10,047.—*Jol. Social Hygiene.*